THE CORNELL ENGINEER

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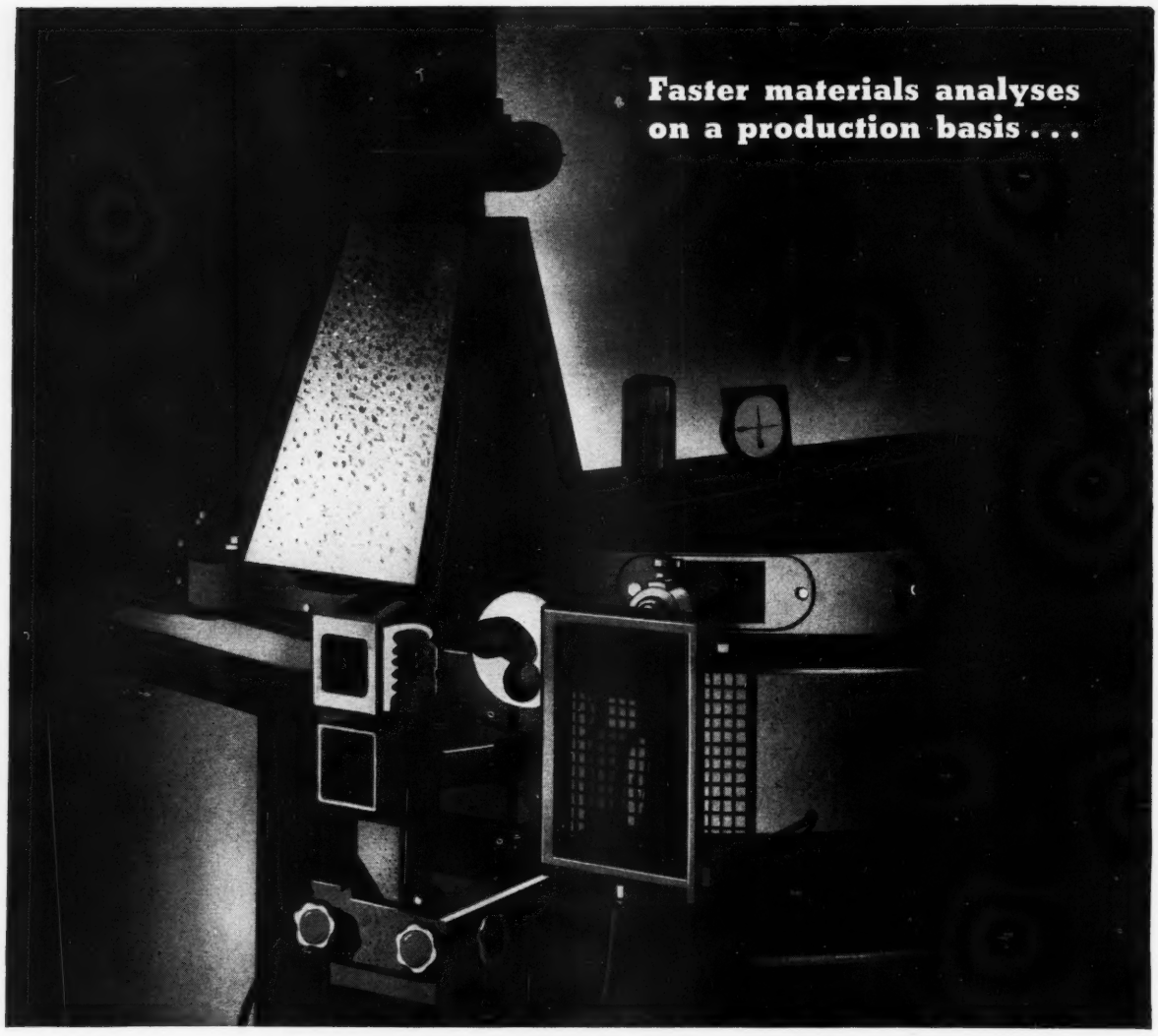

Information supplied by Fairchild Engine and Airplane Corporation

Spectograph equipment is now being used by Fairchild for the analysis of materials. Such analyses are necessary to insure that the materials meet the exacting specifications required for highly stressed engine parts. No deviation can be tolerated and constant laboratory control must be maintained. With the spectographic equipment three men can do the amount of work that formerly required thirty.

The operation of the equipment is simple and understandable. Pellets from chips of the material form the electrodes of a high voltage circuit. Current passed through this circuit causes these electrodes to spark brightly. The total color of this spark is separated by a grating device into the wave lengths of the colors present and recorded on film. As each alloying element has a definite color characteristic when burned, analyses of the film for density of wave lengths quickly show the ingredients present and the amount of each.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE BRIQUETTES . FERROMOLYBDENUM . "CALCIUM MOLYBDATE"

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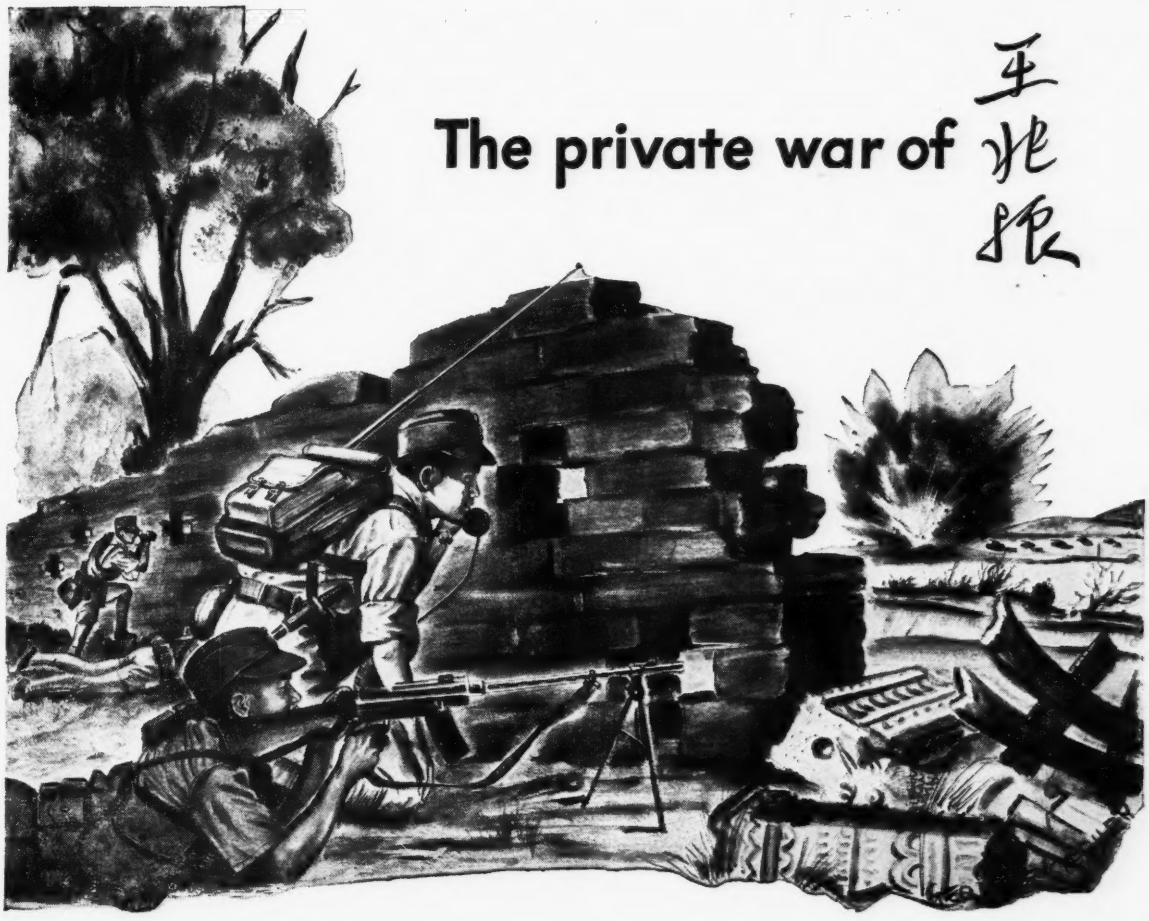
MOLY

The private war of 王兆振



DR. CHAO-CHEN WANG carries a slide rule instead of a rifle. Logarithms are his bullets. Differential equations, his high explosives.

Yet he's waging just as deadly a war, against the hated Japs, as any of his brave compatriots in far off China.

For his is a war of electronics at work!

Since joining Westinghouse last summer, this young Chinese scientist has made several important contributions in the field of electronics design.

One of them—*a new method for measuring the output of ultra high frequency radio tubes*—may prove as valuable to the United Nations as a million machine-gun bullets fired at the enemy!

Dr. Wang is an expert in the mathematics of ultra high frequency communications. He does his "Jap fighting" in one of the Westinghouse Electronics Laboratories.

Here he employs his special genius in calculating — in advance — the performance and characteristics of electronic tubes *before* they actually take form.

★ ★ ★

DR. WANG, and other young engineers who enter our employ every year, are constantly contributing to the "know how" of the Westinghouse organization.

Westinghouse believes in helping young engineers grow and advance as rapidly as possible—for upon these scientists of tomorrow our whole future depends.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.

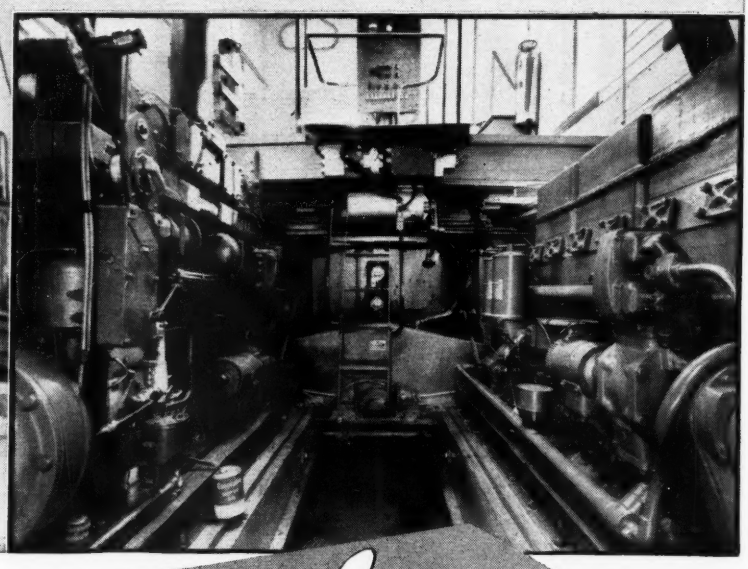
TUNE IN the Westinghouse Program starring John Charles Thomas—NBC Network, Sunday, 2:30 P. M., Eastern War Time.

DR. CHAO-CHEN WANG studied electrical engineering at Chiaotung University in Shanghai. He was sent to Harvard University by the Chinese Government where he specialized in ultra high frequency communications. Before joining Westinghouse, he received his M. S., in 1938, and his Ph. D., in 1940.

Westinghouse

PLANTS IN 25 CITIES—OFFICES EVERYWHERE

TOUGH MARINE POWER PROBLEM Easily Solved with MORSE ROLLER CHAIN MARINE TRANSMISSION



RECENTLY, the Loveland Towing Company, of Philadelphia, who operate a fleet of tugs between Florida and Boston, had what they considered a tough power problem. Their tug, "Maguire", after years of service under its original steam power, was to be converted to diesel propulsion. The owners turned to Buda Diesel Engines and together, with the use of Morse Chains, they worked out a simple, practical and efficient dual drive diesel installation. Two Buda Diesel Engines were connected to propeller shaft through enclosed Roller Chain Drives run in oil. Today, the "Maguire" is in twenty-four hour service, seven days a week. Records show a reduction of 50% in operating cost with greatly increased pulling power.

This is further proof of the stamina and flexibility of the chain drive that cannot slip or waste power. They roll quietly through shocks, overloads, reverse speeds easily and dependably. You, too, can benefit from the efficient power transmission of Morse Chain Drives. Get in touch with your local Morse man today—he is a power transmission expert.

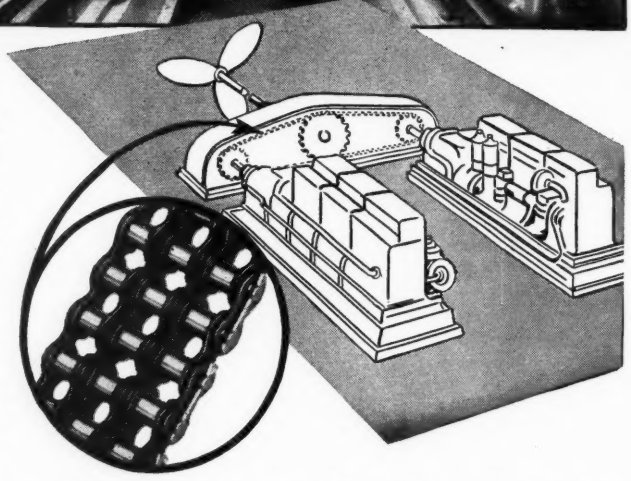


Illustration above shows simple parallel arrangement of two Buda Diesel Engines connected to propeller shaft with encased Morse Chain Drive. The 2:1 reduction in this drive unit, together with that of the reduction gear, gives a total of 4:1 between engine r.p.m. and propeller shaft speeds.

SILENT CHAINS ROLLER CHAINS FLEXIBLE COUPLINGS CLUTCHES

MORSE *positive* DRIVES

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The CORNELL ENGINEER

Volume 8 **MARCH, 1943** Number 6

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Published monthly—October to May—by the **Cornell Engineer, Inc.**, Ithaca, N. Y. Edited by the undergraduates of the College of Engineering, Cornell University. Entered as second class matter at the Post Office at Ithaca, N. Y., under section 103, Act of October 3, 1917.

Subscription per year: regular $1.50; with membership in the Cornell Society of Engineers $2.00 (See President's page); student $1.00; single copy $.20.

Courtesy U. S. Air Services

LOCKHEED "LIGHTNING" FIGHTERS AND A BOEING BOMBER IN DEADLY TEAMWORK

This long range, high altitude striking weapon of the Army Air Forces is making news over France, Germany, Tunis, and the Southwest Pacific.

Ice and the Airplane

WILLIAM LITTLEWOOD, M.E. '20

Vice-president in Charge of Engineering, American Airlines

ICE is frequently beautiful to gaze upon, is indispensable to winter sports, and still accomplishes a large proportion of the world's refrigeration. As with most other natural phenomena out of place, however, ice has from time immemorial hampered the activities of man, most particularly in the fields of transportation. This hampering effect has become more and more evident as speeds of transportation have increased because of the increased rates of ice accretion experienced with increased speeds of motion.

The airplane is inherently susceptible to weight accumulations and more particularly to departures from its normal aerodynamic cleanness and form. In addition, the airplane explores in a brief period of time, both with respect to distance and to its use of altitude, many types of weather conditions. Aviation has already reached global dimensions, and there is always winter somewhere in the world. There are always winter temperatures at sufficient altitude in all parts of the world, although humidity normally decreases with altitude, tending to offset the temperature effect. Icing troubles, therefore, practically vanish in the summer portions of the globe. On the other hand, the duration of effective winter and the annual period of icing problems have been greatly extended for the airplane by its ventures into world-wide high altitude operation.

Two Types Of Trouble

As an impediment to the airplane, icing problems may be roughly divided into catergories. First, atmospheric or airplane icing and, second, engine icing. Let us consider the first of these. Atmospheric ice may be defined as that which forms on any portion of the airplane structure. Such formations in flight are confined to what might be called the impact portions of the airplane and wherever turbulent airflow is caused by protuberances or aerodynamic deficiencies. Common points of accumulation are: leading edges of wings and tail surfaces, propellers, fuselage and cowl noses, windshield irregularities, radio and pitot masts, radio antennae, protruding landing gears, exposed air scoops, and all protuberances or roughness on the exterior airplane surface. Some of these accumulations seriously affect the airplane, whereas others do not. The most serious effect is that occasioned by changes in the location of center of pressure and in lift characteristics of the airfoil surfaces. These obviously include the wings, tail surfaces, and propellers.

The aerodynamic effects are much more serious than the weight effect of accumulated ice. A substantial change in the angle of attack and thrust efficiency of the propeller may result. A substantial increase in the stalling speed and decrease of lift efficiency of the airplane wing may be much more serious than the weight of ice accumulated.

Another effect, with respect to wings and tail surfaces, may be the primary or secondary freezing of ice in the aileron, rudder, or elevator slots, aerodynamically or mechanically interfering with the operation of these control surfaces. Complex slotted wing flap designs may also be susceptible to ice formations in the slots, critically interfering with their aerodynamic functioning. Many of these ten-

THE AUTHOR

DURING his four undergraduate years at Cornell, Mr. Littlewood served for three years on the instructing staffs of the Physics, Mechanics, and Machine Design Departments. He was elected to Tau Beta Pi in his junior year, and for two successive years received the Sibley Prize award in Mechanical Engineering.

In 1935 he received the Wright Brothers Medal Award, granted annually by the S.A.E. for an outstanding contribution to the science of automotive engineering in the aviation field.

William Littlewood

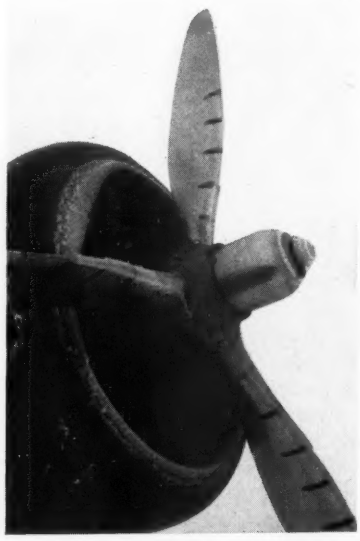
dencies are corrected by detail design features protecting the vulnerable locations from impact or turbulence effects, thereby elminating icing tendencies.

The solution to the problem of impact ice formation on the leading edges of wings and tail surfaces has, to date, been the utilization of inflatable rubber boots. These multiple tube boots installed on the airfoil leading edges and operated through a timed cycle of inflation and deflation, supplemented by surface stretch, mechanically break loose the ice formations which pass off into the airstream. Such provisions have proven remarkably effective. They impose a fairly severe weight penalty, however, and frequently provide in their installation, roughnessses, particularly at the attachment points, which encourage local ice formations by the creation of turbulence.

A different approach to the problem is being made at the present time by the provision of suitable ducts incorporated in the leading edges of the flight surfaces, conveying heated air through the leading edges, and throughout the airfoil structure. This system is designed to maintain surface temperatures slightly above the freezing point. The extension of heat throughout the airfoil structure is necessary with this type of de-icing, since application only to the leading edge, as with the rubber boot, might well result in melting of the leading edge ice and refreezing further back on the flight surface. Normally, there is no ice formation back of the airfoil leading edge, except that which is sometimes encountered at surface roughnesses. With the successful development of heat de-icing, it should be possible to maintain the flight surfaces at all times entirely free of ice. This is a highly desirable objective, particularly with the developing trend toward high power, high performance airplanes with relatively high wing loadings.

De-icing The Propeller

Propeller ice, most serious in its effects on propulsive efficiency in its formation on the propeller blades, is exactly similar in nature to wing ice. Centrifugal force continually seeks to throw it off, but the adhesive strength of its attachment to the propeller is very great. One approach to the problem is therefore to reduce this adhesion by the application to the leading edges of the propeller blades of a suitable material such as alcohol. This method has been quite successful but involves the use of a considerable amount and weight of alcohol for protection over a substantial period of time. Investigations have therefore been made of the possible application of durable pastes and blade coatings to reduce adhesion. Some of the more recent of these attempts have been quite promising. Another approach to the propeller ice problem is the possible application of heat



Propeller Ice

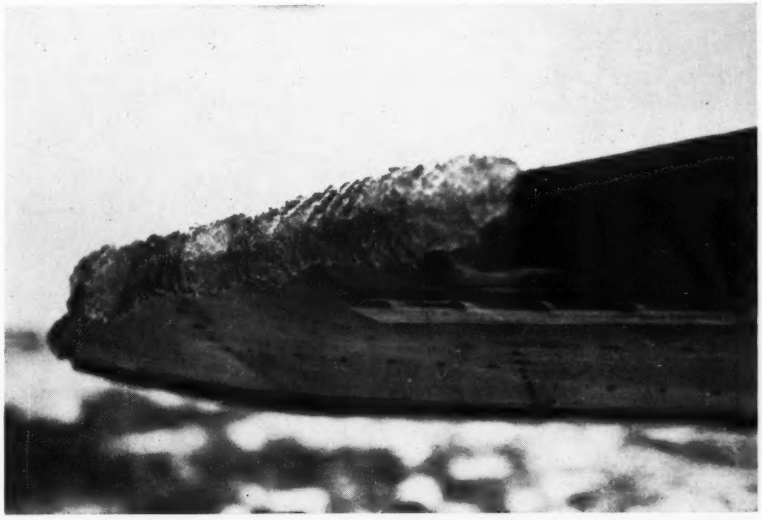
to raise the surface temperature of the blade above freezing. Considerations have been given in the past to the possible use of exhaust heat within hollow propeller blades, but such a system presents many difficulties and has not found practical application. As a prime difficulty, the majority of propeller blades are of solid construction. Another approach to the problem is the possible application of electrical heat to surface heating elements on the leading edges of the blades, and this method, with proper solution of the problem of electrical power source, is felt to hold great promise as a satisfactory propeller ice protection means, with unlimited time capacity.

Airplane ice formations on the nose of the fuselage or engine cowl have not been serious in nature, since they normally involve little aerodynamic effect. Landing accumulations are rapidly being eliminated by the trend toward complete closure and sealing of the landing gear elements in flight. Pitot mast accumulations have been a distinct problem, not only because of their effect on the pitot mast structure resulting in possible structural failure, but also because of their secondary effect on the accuracy of airspeed indications by pressure reactions on the pitot static element. A conscientious effort has therefore been made to eliminate pitot mast accumulations, the pitot head itself being cared for by internal electric heating elements. Pitot masts are de-iced by the application of inflatable leading edge boots or by the application of a sharp leading edge fin and and supplementary alcohol. The sharp fin has been found to result in split ice formations which do not cap the leading edge of the mast. Reduction of adhesion of these split formations by the application of alcohol results in their ready departure into the airstream. The same principles can be applied to radio mast installations.

Radio insulators and antennae have proven to present a difficult icing problem. The principal undesirable effects are possible breakage of the antenna under the weight and air loads of ice accumulations and electrical interferences with radio functioning. The most satisfactory approach to this problem, both for ice protection and aerodynamic efficiency, would be the continued development of submerged antennae, entirely within the airplane structure, or housed in well streamlined coverings of suitable material.

The windshield itself has been a prominent source of icing difficulties. It is susceptible to external ice formations and internal frosting, both of which defeat the needs of pilot vision. The many other requirements of windshield design, such as adequate angles of vision, elimination of cockpit reflections and glare, great strength for bird protection, elimination of double reflections and distorted vision,

have greatly complicated this problem. The approaches to the problem have been along the lines of external alcohol applications, double windshields with heated air or liquid between the panes, the use of electrically heated windshield elements, utilization of internal frost shields, and the direct application of heated air to the inside of the windshield. The most promising of these developments appears to be the double windshield which, supplied with an adequate source of filtered, dried, and heated air available both in flight and on the ground, should give a fully satisfactory solution to the problem, providing that such an arrangement gives adequate consideration to the other basic requirements of the windshield design.



Ice on unprotected tip of stabilizer

The engine intake airscoop itself, including the intake air screen, and all other external protuberances on the airplane creating turbulence or exposed to impact airflow, are susceptible to airplane ice. With reference to scattered surface roughnesses and protuberances, the only reasonable cure is their entire elimination, and the trend of modern airplane design has definitely indicated the acceptance of this answer. The external engine airscoop is generally considered essential. Its intake airscreen is also usually considered necessary. The solution to this problem has therefore been the incorporation of a secondary air entrance to the engine, eliminating engine ram effect and, to a slight degree, reducing full engine power or critical altitude, but located in a completely shielded position to which there is no direct entry of ice forming moisture. This supplementary intake for use under ice forming conditions, may be taken behind the engine cylinders, within the engine cowl, or in some other shielded location.

Engine Ice

We now come to an entirely different type of ice which we have called engine ice. Such ice occurs in the engine induction system between the engine air intake and the engine itself, primarily from the evaporative cooling of the gasoline introduced by carburetion into the incoming airstream. Engine ice is encountered at outside air temperatures far above freezing and is largely a function of atmospheric humidity, throttle opening, rate of airflow, and richness of fuel-air mixture. In the old type of carburetors employing single or multiple venturi tubes into which the gasoline was metered, the problem was very serious. A frequent result was freezing of the engine throttles which were usually located between the venturis and the engine, or freezing of the venturis themselves, with a complete blocking of the induction system.

These difficulties led to the development of the so-called "non-icing" carburetors. In one of these carburetor types, the gasoline is injected below the throttles and in such a position that wet fuel should not contact the induction system inner walls. Any ice formed, therefore, is presumably carried on into the engine in the form of small particles which cause no serious effect. The other form of non-icing carburetor accomplishes its throttling and metering entirely with the incoming airstream, and the gasoline itself is not injected until the air reaches the immediate entry to the engine supercharger impeller, after which the heat generated by compression in the supercharger prevents ice formation. With both of these carburetors, however, the problem has not been entirely, eliminated except as to the carburetor itself. Particularly at part throttle, some turbulence is created in the induction system below the carburetor with the result that liquid fuel, super-cooled by evaporation, contacts the walls of the induction system and establishes ice formations. The presence in the induction system of any protuberances, such as thermometers or injection nozzles, also tends to create turbulence with resulting ice formations.

The basic cure to the problem, to date, has been by the application at the engine air intake of exhaust heated air, as required, to raise the temperature of the fuel-air mixture below the carburetor to a point above freezing. Other approaches have included jacketing the vulnerable parts of the induction system with heated engine oil or with engine exhaust gas, but these methods have proven objectionable, and in most cases inadequate. A substantial improvement in the basic problem is unquestionably accomplished by the introduction of the entering air from a shield location, reducing the amount of moisture susceptible to freezing. The use of non-icing type carburetors has also greatly simplified the problem.

An Emergency Method

These provisions, plus the application of a reasonable amount of heat, are quite adequate for safe operation. There is, however, frequently added one further safeguard. If, inadvertently, induction

(*Continued on page* 32)

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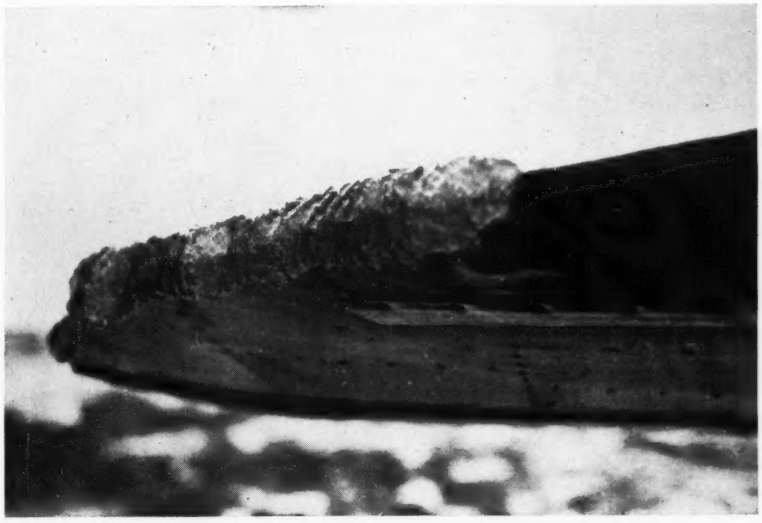

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(*Continued on page* 32)

High Altitude Flying

CHARLES C. HANSEN, ME '46

Cuts Courtesy *Flying Magazine*

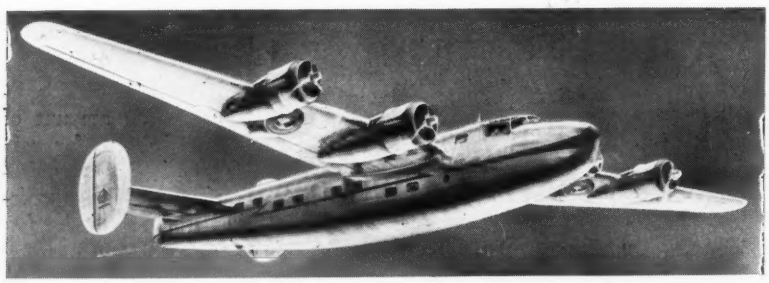
A PLANE rests at the end of a mile-long runway at the Chicago airport waiting for the takeoff signal. Nothing startling about its design—it looks like a brother of the American transport planes of 1940; only it seems larger, better streamlined, more powerful. It roars off and up into the stratosphere—next stop, fifteen hours, London. Such a sight should become common within five years after the termination of the war.

There are problems to be solved, and gadgets to be built; but the most difficult job, that of pioneering, has already been completed. This pioneering began a long time ago. Back in 1783 the French Montgolfier brothers started it when they kindled a fire under a paper and linen balloon and sent it up to six thousand feet. Eighty years later, two Englishmen, Coxwell and Glaisher, went up five miles in an open balloon. As they ascended into the thin air, Glaisher first became completely paralyzed and then fell senseless into the basket. With frozen hands, Coxwell finally released the gas valve and the balloon descended. In 1927, after several record-breaking flights, Capt. H. C. Gray of the U. S. Army, using an oxygen mask and heavy clothing, rose to a height of over eight miles. The journey, however, cost the pioneer his life; he remains a martyr to stratosphere exploration. A few years later Professor Auguste Piccard, a Belgian physics teacher, conceived the idea of using an airtight aluminum sphere instead of a balloon basket. His flight was no crack-brained, publicity stunt; he was engaged in purely scientific research. After two failures he and his assistant rose to a height of nine miles and launched an epidemic of stratosphere flights; these were climaxed in 1935 by Stevens and Anderson's trip in the *Explorer II* to a height of nearly fourteen miles.

Meanwhile, the heavier-than-air craft were having their own altitude contest. A height of more than ten miles was attained in 1938 by the Italian, Pezzi, using a special Caproni biplane and an air-tight, heated, pressure suit—much like that of a deep sea diver.

The stratosphere is not a comfortable place in which to be. For every thousand feet of altitude the temperature drops an average of 3.6° F., until it reaches a constant average temperature of -67° F. at 35,000 feet. The air pressure at 20,000 ft. drops to half an atmosphere and at 40,000 ft., which approaches the probable height of stratosphere flight, the pressure is one-fifth of an atmosphere. Although the percent of oxygen present in this air is about the same as that at sea level, the pressure is too low to force even the small amount of oxygen present in the thin air into the cells of a man's lungs. For this reason even oxygen masks are of little use above 40,000 ft. The unprotected human being suffers from further altitude trouble: on quick ascents "bends", similar to those of deep-sea divers, cause "blackouts" and unconsciousness. This is because nitrogen, which had been dissolved in the blood, bubbles off and expands under reduced pressure; also, intestinal gas enlarges its volume and causes marked discomfort.

Artist's sketch of bomber converted to stratoliner



Effects On Plane

Not only the flyer but also his plane is affected at high altitudes. In rarefied air the motor is not able to get enough oxygen; the thin, high-speed propeller bites into practically nothing; the wings cannot get any lift; the fuel vaporizes in the tank; and without air for insulation, magnetos and distributors fail to run properly.

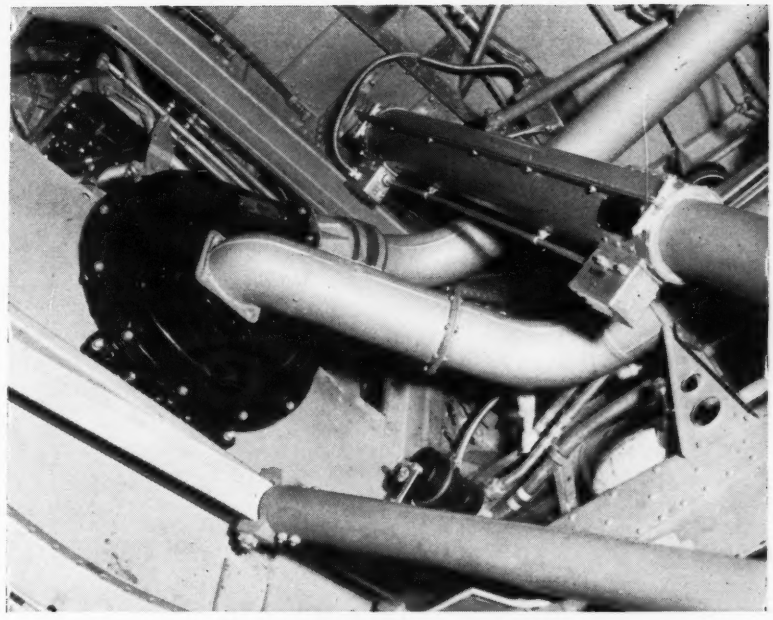
Most of these problems have solutions. The fact that a record airplane flight reached a height of ten miles shows that mechanical problems are not unbeatable. Magnetos and gas tanks can be kept under pressure. Propellers must be adjustable so they can take deep "bites" into the rarefied air. Gigantic four to six blade models may be used. Wing design presents a more complicated problem. The air foil that is efficient for low altitude flying may not work at all upstairs. Is it best to put on a good low altitude wing, zoom up to the statosphere, and struggle to stay up there at low speed? Or is it better to put on a good stratosphere wing and have trouble with takeoffs and landings? Probably the best solution is a compromise airfoil of some kind.

The answer to the motor's cry for oxygen is the supercharger. This mechanism was designed originally to give more power to the planes of the first World War. There are now two kinds of superchargers. One is directly geared to the engine shaft, while the other is powered by having the motor exhaust gases run a turbine; each type operates a compressor which supplies air to the engine. For stratosphere, the turbosupercharger seems to be the better machine.

During World War I, Dr. Sanford A. Moss, a former instructor at Cornell, was a pioneer in the supercharger field and designer of the turbosupercharger. The Armistice came along to halt much of the research work on superchargers. Dr. Moss and several other men continued to design, experiment, and build, setting a few brief airplane altitude records by way of recreation. For years no one seemed to want the innovation now that it had been finished. Then, finally, Moss saw his brainchild come into general use on the Boeing Flying Fortresses and other planes. Where once he and four other men turned out the country's entire supercharger production in a small plant, now three great factories are swinging into production.

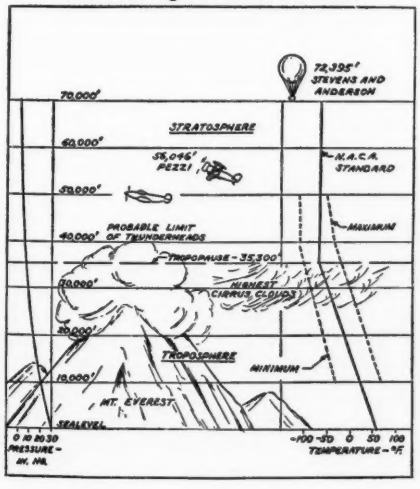
Says Dr. Moss: "First they told me it couldn't be done. Then they said, What's the good of it? And now what do they say?—'We were going to do it all the time'."

The best way to maintain life in the stratosphere seems to be the use of a pressure cabin. Individual pressure suits are difficult to put on and take off and are cumbersome in the operation of the airplane controls. The pressure cabin would eliminate these disadvantages; but it is heavy. It must have a sturdy shell to withstand the inner air pressure and must contain devices to maintain this pressure, supply oxygen, and control the cabin temperature. A sealed cabin will be susceptible to frosted windshields, and more equipment will be needed to prevent such a condition. All of which points to the fact that a pressure cabin entails increased weight and enlarged structural dimensions.



Turbosupercharger on an early plane

Meteorological attitude chart



Before the war, the TWA airlines had in operation several Boeing 307-B Stratoliners. These big 33 passenger, four-engine ships were the first proof that stratosphere flying would work. They have pressure cabins which are "supercharged" with a pair of compressor fans which take the outside air and "pack" it into the cabin. Whereas 12,000 ft. was the traditional transport ceiling without oxygen, the Stratoliners operated at 20,000 ft. without breathing discomfort. This supercharged cabin method does not require the use of additional oxygen.

One Stratoliner in ten months of constant use flew 1,031,320 miles and carried 21,808 passengers. This was done at a profit and proved a practical success. At 20,000 ft. the ship flew above most storms and rough weather. On one flight this Stratoliner, with the help of a tail wind, averaged 350 miles per hour and easily attained 25,000 ft. The Stratoliners are now continuing to shoulder a heavy burden as part of the Army Air Forces.

High Combat

On July 25th, 1941, a flight of Boeing Flying Fortresses bombed the German battleships *Gneisenau* and *Scharnhorst* from a height of about 35,000 ft. The first warning provided the Germans was the scream of bombs. Out of the effective reach of anti-aircraft guns and enemy fighters, the Fortresses were able to unload their bombs at will. The new twin-engined Lockheed P-38 interceptor and the big, single engined Republic P-47 "Thunderbolt" both fly at heights above 30,000 ft.

Since modern war demands high-flying planes, research on stratosphere flight will continue through the war. Then when the war is over, those plane assembly lines now building four-engined bombers can begin working on sub-stratosphere transport planes. As time goes on, these planes will fly higher and faster and farther. Up in the stratosphere—where weather is always clear and cold, and the sun is brilliant, and the sky is black: Chicago to London in 15 hours—or less!

Rings Around New York

ROBERT A. OLMSTED, CE '45

Photographs Courtesy *Construction Methods*

NEW York City's long awaited dream, the complete encirclement of the giant metropolis with a series of express highways, is well on the way to realization. There are, in addition to an artery encompassing the City at its edges, a number of smaller rings; for example, the surrounding of Manhattan, and the dividing of Brooklyn and Queens into areas served by express highways. These notable works of engineering, the construction of which has been spread over a number of years with no end yet in sight, involves an investment of hundreds of millions of dollars.

The traffic problem is naturally a modern one. It became acute with the rise in the use of the automobile in the 20's and 30's, and presumably will remain so after the war. Steps to relieve traffic congestion and improve the efficiency of the flow of traffic were begun quite some time ago.

Beginning with Manhattan Island, forming the heart of New York City, we find that the first major step in this encirclement of New York was the construction of the Miller Highway, better known as the West Side Elevated Highway. It was constructed under the direction of the Borough President of Manhattan as an approach to the Holland Tunnel which opened in 1927. This highway is four miles in length and follows the busy commercial Hudson River waterfront from 72nd Street to the Tunnel at Canal Street. The roadway is built on an elevated structure, and the pillars supporting it rest on the street below. The two, unidirectional, three-lane, separated roads are paved with granite blocks. The highway has since been extended southward about half a mile in order to provide an approach to the Brooklyn-Battery Tunnel, still a mile further on, to which it will ultimately lead. This portion differs from the earlier one in that it is paved with concrete, providing smoother running. One of the engineering problems of this extension arose at Canal Street, under which lies the Holland Tunnel. It was not desirable to have the weight of the highway bear on the tubes below. This was solved by constructing a 360 foot steel arch bridging the street. This also had the added advantage of avoiding objectionable pillars at a busy intersection used by some 50,000 cars a day. Access may be had to the highway by means of ramps at the major streets.

The upper West Side benefited by the West Side Improvements, which was opened in 1937 and includes the construction of the Henry Hudson Parkway along the river's edge and into the Bronx. The New York Central freight railroad with tracks running through Riverside Park had long been an eyesore. By placing a portion of this railroad underground, the acreage of the Park was increased. This was further augmented by filling in the river out to the bulkhead line. The Parkway itself, some of which is directly over the railroad tracks, is a six lane, concrete express highway connecting with the Westchester Parkway system. A double-decked steel arch bridge carries the road across the Harlem River. Only the lower deck was built at first, but the upper one was soon added, as traffic conditions warranted it. In spite of its great capacity, it was unable to cope with pre-war holiday traffic.

The most modern and interesting section of the "Ring Around Manhattan" is the East River Drive. The original portion, about a mile and a half in length, was opened in 1936 as an approach to the Triborough Bridge. An aiding PWA grant made possible the construction of the two and a half mile section from 49th Street to 92nd Street which was started early in 1939. The construction of this portion of the Drive involved some unusual engineering problems. Hemmed in by the U.S. bulkhead line to one side, beyond which the river could not be filled in, and expensive apartment houses and other highly developed real estate on the other side, the right of way was found to be too narrow in many places for two 32

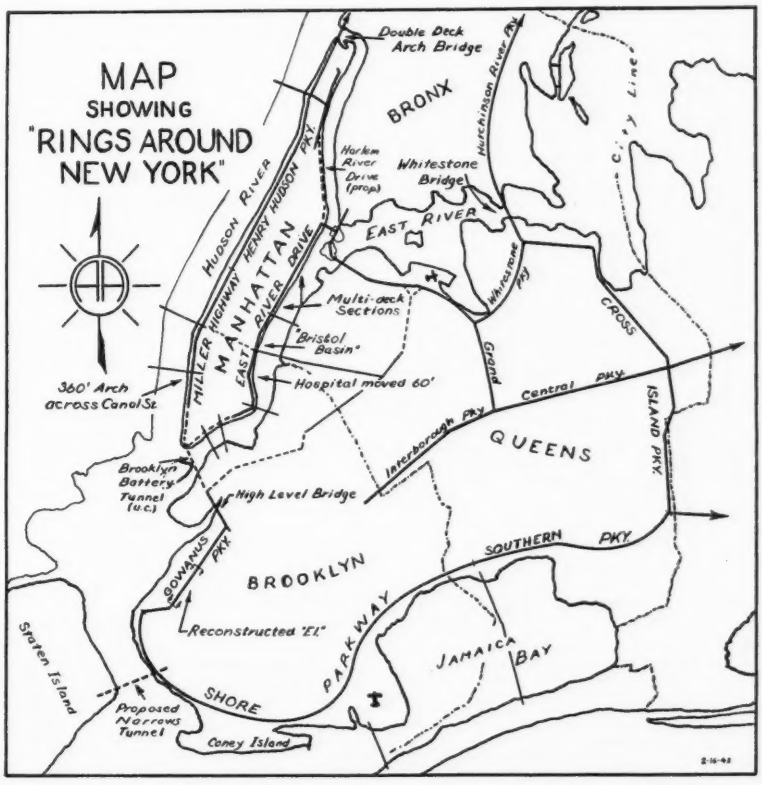
Hospital building being moved *World Wide Photo*

foot roadways. This problem was solved by building a double-deck structure, with the southbound road above the northbound, and to top it off, a pedestrian esplanade was added as a third deck in many places. In one place a quadruple deck exists. A small school playground which would have had to be removed as it was situated in the path of the highway, was reconstructed above the esplanade. At times these multi-deck viaducts are located entirely over the river, supported by concrete piers. In one place the East River Drive tunnels under a park, hiding the Drive from view. This section of the Drive is a true express highway, containing no stop lights or grade crossings. Concrete is used wherever possible, the roadways and pillars both being made of it.

The next section of the Drive involved problems of a different type. It passes through the busy waterfront facilities of power companies, a meat-packing plant, and a railroad. The structures supplying the power plants with coal were completely rebuilt at a considerable expense in order to allow room for the Drive to pass. The railroad dock was crossed by means of a viaduct, and a tunnel was built under the drive leading to a slaughterhouse. The fill used for this section is of interest. Supply ships returning from England contain rubble from bombed British cities as ballast. As wreckage from the city of Bristol was used as fill, this section has been dubbed "Bristol Basin." The southernmost existing section of the Drive resulted in the addition of about 35 acres of parkland to the city. Another narrow right of way was encountered here, but this problem was solved in a different way than before. A five story hospital was moved to a new location sixty feet away. It is planned to complete the highway after the war by constructing an elevated portion from the present southern end to the Brooklyn-Battery Tunnel. This includes the construction of a tunnel under Battery Park to the West Side. It is also planned to improve parts of the existing Drive, by eliminating stop lights and grade crossings.

A missing link in the "Ring Around Manhattan" is the proposed two and one half mile Harlem River Drive. This highway will begin at the present terminus of the East River Drive at the Triborough Bridge (125th Street) and extend northward to the existing Harlem River Speedway opposite 165th Street. This Drive will provide convenient approach to the George Washington Bridge. In order that the commercial use of the river shall continue as usual, a marginal street is to be constructed between the Drive and the water's edge. Parks will be built at various locations along the road.

With the completion of these projects, Manhattan Island will be completely encircled by high speed traffic arteries, dilapidated river fronts will have been cleared up, and acres of new and improved parklands will have been added to the Island.



Belt Parkway

The most important "Ring Around New York" is the Belt Parkway, which skirts the edge of Queens and Brooklyn for some thirty-one miles. This great stretch of highway, costing thirty million dollars, was opened in June 1940. Actually it is made up of the Cross Island Parkway, leading from the Whitestone bridge across Long Island (Queens); the Southern Parkway; and the Shore Parkway, following the Brooklyn waterfront along Jamaica Bay, Coney Island, Gravesend Bay, and the Narrows. By means of more than fifty bridges, including a 270 foot viaduct, six bridges over waterways, and numerous pedestrian overpasses, there is not one stop light or grade crossing along the entire route, a large portion of which follows old Indian trails. With the exception of the Southern Parkway, the highways carry two lanes of traffic in each direction, with a central strip wide enough for the construction of an additional lane in each direction in the future. The Southern Parkway was built with all six lanes. New "shoe string" parks have been developed. One of the world's most beautiful and longest suspension bridges, the Whitestone, allows the Belt Parkway to cross the East River and enter the Westchester Parkway System via the Hutchinson River

(Continued on page 28)

NEWS OF THE COLLEGE

ESMWT At Buffalo

APPROVAL of the appointment of 12 new part-time instructors for the Buffalo area, in the Engineering, Science, and Management War Training program of Cornell University has been announced by Director Walter L. Conwell.

The additions brought the total number of instructors in the industrial training courses to seven full-time and 27 part-time members, and reflect, Director Conwell said, the expansion of the work in the Buffalo area and the greatly increased emphasis on war jobs.

Buffalo thereby became the most important area in Conwell's entire state program, judged by the number of courses offered, the enrollments, and the extent of the teaching personnel. Thirty courses were offered in the current term which ends soon, with 1400 persons enrolled. When the war training program started in Buffalo in December, 1940, there was only one course, taught by one part-time and three full-time instructors.

The additions to the part-time instruction staff, and their fields of work are: Edward J. Friend, Karl F. Bohn, and Robert L. Wirt, all in engineering; L. N. Lawton, Paul D. Frost, Charles O. Burgess, and Charles M. Offenhauer, all in metallurgy; Marvin W. Swanson, industrial engineering; Leslie J. Vedder, engineering mathematics; Edward J. Rahill, communication engineering; Edward C. Forbes, heat power engineering; and Clyde F. Smith, instructor in the ordnance materiel inspection course.

R. F. Howes Called

RAYMOND F. Howes, since last July the acting director of the Department of Information at Cornell and former literary advisor for the CORNELL ENGINEER, has accepted a commission as lieutenant in the U. S. Naval Reserve, Department of Navy Personnel.

Mr. Howes, who succeeded Mr. Louis C. Boochever as acting director of Public Information at Cornell, prepared for college at the Elmira Free Academy. He received his A.B. degree from Cornell in 1924 and his M.A. from the University of Pittsburg in 1926, returning to Ithaca in 1936 from St. Louis, where he was professor of English and director of the news bureau at the Washington University.

Since his return to Cornell he has been assistant to the executive secretary of the Cornellian Council, assistant to the dean of the College of Engineering, assistant to the provost of the University, and finally, acting Director of Public Information.

Raymond F. Howes '24

He has also been a free lance writer for several magazines, editor and co-author of "Debating" and "Our Cornell," and co-author of "Coleridge, the Talker," published in 1940 by the Cornell University Press. He has also been a contributing editor of the *Cornell Alumni News,* and a member of several societies; including, Sigma Delta Chi, Delta Sigma Rho, and Omicron Delta Kappa.

James S. Knapp, who has been assistant director for the past six months, will now assume the duties of full director.

Military Specialization

IT has been announced that Cornell is one of the schools selected by the Army and Navy for training its men in various technical fields.

The University is awaiting word from these services before setting up any kind of a program, since the training is going to be standardized for the entire country. However, it is believed that instruction will be started before the end of the present semester, although even the exact day is uncertain.

It is proposed that of those who have had three months of basic training, some will be selected for a nine months period of technical training. Present plans are to eventually give this training to about 200,000 men. Of these a few will be selected for more advanced training in such fields as electrical and mechanical engineering. One of the greatest difficulties anticipated by the University is co-ordinating the Army's twelve week term with the Navy's fifteen or sixteen week term, since both have separate contracts with Cornell.

Along with this training the University intends to maintain instruction for seventeen year-olds and those who have been draft-deferred. However, some of the more highly specialized and optional courses will probably be dropped due to the expectedly large demand for instructors in freshman and sophomore courses.

January Graduation

Cornell University's 74th commencement, the first ever to be held in midwinter, took place on Sunday, January 24th. Stripped of many of the usual colorful features, such as the academic procession in caps and gowns, the ceremony had wartime simplicity.

Departing from another tradition, Cornell used the exercises not merely to confer degrees upon undergraduates and graduate stu-

dents, but to honor hundreds of men who have left the University or will soon leave to enter military service. The faculty sometime ago authorized the presentation of special certificates to students entering the armed forces before completing the requirements for their degrees.

The following forty-six men were recommended for the engineering degrees indicated, last January.

For the degree of B.C.E:

Arias, A.
Aisenberg, B. P.
*Cohen, J.
Concors, A. F.
Findlay, R. C.
Gustafson, H. A.
Hildabrand, T. J.
Hoag, N. F.
Kopczynski, A. J.
Marquart, O.
Rupley, G. M.
Thalman, W. A.

For the degree of C.E.:

Miller, E. A.
Shoemaker, C. C.

For the degree of B.S. in A.E. (Civil Engineer):

Hewett, R. W.

For the degree of B.M. E.:

Binder, A. F.
Gill, A. S., Jr.
Matteson, B. H.
Morse, T. K.
Peelle, L. W.
*Perry, R. W., Jr.
*Pierce, L. J.
Pierce, W. B.
Pierpoline, M. F.
*Sens, W. H.
Stewart, R. W.

For the degree of B.S. in A.E. (Mechanical engineers).

Baer, J. W.
Bradt, M., Jr.
Bruderlin, E. B.
Clark, A. J.
Eddy, A. B.
Glass, A.
Griffith, R. D.
Hudson, J. H.
Kandiko, J. C., Jr.
Kulka, J. M.
Lamp, C. W.
Levy, S. W.
Mallen, P., III
Pope, B. A.
Schwarz, R. C., Jr.
Smallridge, B. E.
Steenburgh, R. C.
Stocking, J. W.
Whipple, C. J., Jr.
Zavas, F.

Asterisk indicates with distinction.

Faculty At AIEE Meeting

TEN staff members of the School of Electrical Engineering attended the annual meeting of the American Institute of Electrical Engineers in New York City, January 25 to 29. Some also attended sessions of the Institute of Radio Engineering held at the same time.

Those who attended from Cornell are Dr. W. A. Lewis, Director of the School, who is a member of two AIEE committees, one on basic science and the other on protective devices; Prof. E. M. Strong, chairman of the committee on illumination; and Prof. R. W. Ager, secretary of the basic science committee.

Courtesy of Westinghouse

Prof. Strong (second from left) at A.I.E.E. Convention

Others who were at various sessions during the week included Professors L. A. Burckmyer, Jr., E. T. B. Gross, W. W. Cotner, B. K. Northrop, A. B. Credle, H. G. Smith, and W. C. Ballard, Jr.

The program this year included a variety of subjects and technical papers on electricity and communications, including defense lighting, railway electrification, industrial power, electronic tubes in wartime, transmission lines, and wartime engineering education.

ASCE Meeting

AT a joint meeting of the Ithaca Section and the Cornell Student Chapter of the ASCE, H. T. Immerman gave a lecture entitled "Underpinning". Mr. Immerman is chief designing engineer for Spencer, White, and Prentiss, Engineers and Contractors, who specialize in underpinning. Because of his long experience in this difficult phase of foundation engineering, Mr. Immerman has come to be considered an authority in this field.

An underpinning is a support to a foundation which extends to a much greater depth and thus permits the carrying of a larger load. It is put in after the foundation has been placed to prevent a great settlement of the structure. Mr. Immerman described in detail a method used by his concern in which the load bearing capacity of the underpinning is tested as it is put into place. With the aid of slides the speaker closed the talk by discussing some of the tricky problems he has faced in recent years.

AIEE Meeting

SKETCHING in broad outline some of the future benefits and problems which will face the people of the world on emerging from this epic struggle, Mr. C. A. Powel of Westinghouse spoke before the American Institute of Electrical Engineers on Friday night, February 12, 1943.

Mr. Powel, manager of the headquarters, Engineering Departments of Westinghouse Electric and Manufacturing Co., Pittsburgh, is well equipped to speak on the subject, having traveled extensively. During the last war, the Vice-President of the AIEE was in the service of the British government doing work in the Orient. His forceful and intelligent insight into this subject provided an interesting and instructive time for his audience.

In a prepared speech, Mr. Powel pointed to the wide range of technical developments resulting from the war, as yet unavailable to the public, including such devices as submarine and aviation controls and micro-waves. Already a certain type of synthetic rubber, Buna S., has proved its value in tires and

(*Continued on page* 30)

OUTSTANDING

Mr. Williams

Herbert H. Williams

LOOKING for a job? Well, hardly, what with the future of students largely being molded by current conditions. However, Mr. Herbert Williams can answer most inquiries on all types of jobs, whether they be in industry or in those occupations known as the Army, Navy, or Marines. Serving now in the capacity of Assistant to the Dean in the College of Engineering, Mr. Williams was formerly the head of the University Placement Bureau; but this is putting the cart before the horse.

Mr. Williams was born in Brooklyn. (Remember, there is more to Brooklyn than just the Dodgers). Whether the presence of these selfsame Dodgers was the cause of it or not is unknown, but when Herb was only six weeks old, the family moved to northern Michigan. Business took his family from there to Toronto twelve years later. Reaching high school age, while living in that Canadian city, Mr. Williams entered the University of Toronto School and studied there for three years. Meanwhile, the Dodgers had quieted down considerably and it was once again safe for civilization to return to Brooklyn. On the move again, the Williamses returned to Brooklyn, where Herb rounded out his secondary school education at Adelphi Academy.

The year was now 1920, and the memories of the war were still fresh in people's minds. The tramp, tramp, tramp of marching boys was still an echo and with the tramp, tramp ringing in his ears, off went Herb to the sea on a tramp steamer, which we shall more politely call a freighter because the vessel was captained by a former Cornell Ag student. The journey took Herb 22,000 miles around the world during 10,000 of which he was at the helm. It is interesting to note that the ship on which he traveled was built by the Japanese for our country in the last war.

Upon completion of this trip, Mr. Williams entered Cornell in February of 1922. Studying Civil Engineering, he graduated four years later in February, 1926. It was the influence of a Cornell father and Cornell uncles that led him to select Cornell. Earning his numerals in football his frosh year, he continued with this sport in his sophomore and junior years. Finally, his studies began to take too much of his time and he was forced to abandon sports as well as other extra-curricular activities. His abilities were recognized, however, and he was elected to Pyramid. While at Cornell, he joined Psi Upsilon fraternity.

It was back to Brooklyn after Cornell, not to burn the bridges he had left behind, but to build new ones for the Port of New York Au-

(*Continued on page* 34)

Donald L. Johnson, EE

FOUR years ago we saw Don Johnson enter Cornell as a Frosh in AE. Today, we find him about to graduate as an EE.

Don switched to straight EE last year because of Radar work. Radar is a recent development by means of which planes, tanks, and ships may be located by ultra high-frequency radio waves. British superiority in this type of equipment is given as one of the chief reasons why England was saved in the Battle of Britain. Rapid advancement has been made in the last two years, most of which is secret. Specialized men are needed who have had communication and radio experience. This is where Don comes in. As a straight EE he gets his preliminary background here at Cornell with about thirty-five others and then goes to a special Army school for three months. Don's military status is quite peculiar. He finished advanced drill at the end of his sophomore year. He expects to have his commission as Second Lieutenant in the Infantry, thus obtained, transferred to the Signal Corps when he graduates.

Don has not been wasting his time at Cornell. He won his letter in 150 lb. crew, and he is captain of the rifle team, which, incidentally was runner up for the national championship when Don was a sophomore. He is a member of Sphinx Head; Tau Beti Pi, honorary engineering society; Eta Kappa Nu, honorary electrical engineer-society; and Kappa Tau Chi, administrative engineering society. He was recently elected to Phi Kappa Phi. He is also a member of the Delta Club, electrical engineering social society, and the Officers Club. He represented the fraternities on the Cornell for Victory committee last year.

Don also kept himself well occupied during the summer. Last summer he worked with the Illinois Bell Telephone Company, the summer before last he was an instructor at the Culver Military Academy, and after his freshman year he was at the ROTC camp at Plattsburg, N. Y.

Don

PERSONALITIES

Philip H. Permar, ChemE

AFTER listening to his Dad, a doctor in a Pittsburgh hospital, talk about hospitals and doctors for ten or fifteen years, Phil Permar decided he wanted to be a chemical engineer. He left his native Pittsburgh for Cornell almost five years ago to get away from the city and to pick up a technical education.

Like many of his classmates, Phil started his college career at Frosh Camp. That was in the 1938 hurricane, with three full days of rain. His spirits undampened, Phil, possessing a McMullen scholarship, joined the Camera Club, went out for the photographic board of the "Widow", and made the Dean's List for the first and last time during his Freshman year. The next year he made the "Widow" board, Al-Djebar (honorary chemical society) and Retort and Beaker. By the time the third year rolled along, he was photographic editor of the "Widow", treasurer of Retort and Beaker and was elected to the Savage Club. In his fourth year he became president of the AIChemE and also of Retort and Beaker. He became student member of the executive board of the Savage Club. We now find him as a part-time assistant in the School of Chemical Engineering, teaching metallography.

It seems that Phil has always been interested in metallography. Two summers ago he was a routine chemist with the Copperweld Steel Company, while last summer he served as a metallurgical observer at the Carnegie Steel plant at Gary, Ind. After he graduates he expects a job with DuPont in their experimental station in Wilmington. The job will be a combination of chemical engineering and metallurgy.

As a busy ChemE, Phil has quite a collection of hobbies. He is interested in photography, magic (sleight of hand tricks are a forte), amateur radio (he had a station at his fraternity house), and painting (he says it's diverting). He was counselor at a summer camp in New Hampshire for seven summers in a row.

Among his other achievements, Phil was treasurer and house manager of his fraternity, Phi Sigma Kappa, in his fourth year, and for two years was one of the ChemE's on the Student Engineering Council, which puts on the Cornell Day Shows.

Phil

Wallace R. Seeley, ME

SOME fifty odd years ago, the common cry was "Go west, young man, go west." Well, living already in the West, Wally Seeley and his family decided to look over the East. Pulling up the stakes in his home town of DesMoines, Iowa, when Wally was four, his family traveled eastward and settled in Philadelphia. Deciding that they were not far enough east, they again moved a year later to Salina. (Somebody says they've since changed the name of the city to Syracuse, now that the salt mines in that region aren't what they used to be.) Content then, they are content now, still living in that same city.

Wally has turned out to be quite a problem child. Who ever heard of a captain of a football team that was once valedictorian of his senior class in high school? Wally fills the bill, although he reminded us that he'd pulled down a 20 in a Strength prelim last year. His problem began in high school, where he served on the student council, won his letter in football, and, incidentally, as mentioned above, was valedictorian of his senior class. All this took place in Syracuse. Being the son of a Cornell engineer, M. E. '10, where else might he go to college but to Cornell? The powers and the U. S. Army permitting, he'll graduate as a Mechanical Engineer in May.

Wally

As has been discovered by more than one person, so it was discovered by Wally that one can do something more with his time in college than just study. After just meddling around with football his frosh year, as he put it, he won his numerals for his shifty work at guard. Lacking the weight to crash the varsity (he's only five feet and some inches tall and considerably less than five feet wide), he tried his luck in the next three years at 150 football. He never did much, so he claims, which just rides along with his usual modesty when one considers that he was captain last year.

In his freshman year, Wally joined Sigma Chi. Since that time, he has had an active part in several campus activities, notably, the Freshman Advisory Committee, the Ice Carnival Committee of 1942, and the Freshman Camp of 1942. The net result of his interest in campus activities was his election to Quill and Dagger, to Atmos, and to Scabbard and Blade. Pure luck, as he puts it, but quite obviously

(*Continued on page* 34)

CORNELL SOCIETY of ENGINEERS

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WILLIAM H. HILL, *Vice-President*
501 Klag Ave., Trenton, N. J.

"The objects of this Society are to promote the welfare of the College of Engineering at Cornell University, its graduates and former students and to establish a closer relationship between the college and the alumni."

President's Message

Fellow Cornellians:

Your Society is very much interested in the Cornell University Placement Bureau and has for a great many years contributed ten percent of its income toward this worthy effort. That in itself is very little; more a token payment toward the support of an activity which the Society considers most valuable and helpful to the Alumni.

In the November issue I discussed the organization of the Placement Bureau, how it functions, and what it has accomplished. Last Fall at the biennial convention of the Cornell Alumni Association the status of the Bureau was discussed as some of its financial support had been withdrawn and there was every indication that its usefulness would be impaired unless something were done about it.

At that meeting the newly elected officers were requested to investigate the Placement Bureau and if satisfied that its work should continue not only during the war period, but thereafter, to make a definite recommendation to the University as to its organization, how it should function, its probable budget and, most important, where the funds were to be obtained to keep it going.

Lawrence E. Gubb '16, the new president of the Cornell Alumni Association has appointed the following committee to make this study:

Prof. A. Wright Gibson '17
Weyland Pfeiffer '16
Miss Ruth Irish '22
George N. Brown '08
Sidney W. Edlund '13
William L. Kleitz '15, Chairman

I am pleased to announce that the committee has held its first meeting with another one scheduled in the near future so that its report can be submitted to the executive committee on the Alumni Association at their March meeting. More about this at a later date.

Your Society, as a member of the Cornell Alumni Association, has received a communication from the Committee on Alumni Trustee Nominations requesting names of nominees with their qualifications either from the Society or from individuals for the Spring election. This letter states "The Committee on Alumni Trustee Nominations was created by the Cornell Alumni Association to stimulate continuous and exhaustive search for the ablest alumni and alumnae to be placed in nomination, the highest honor the associated alumni can confer.

George N. Brown '08

The Committee invites from alumni groups and individuals suggestions for its guidance as to types of alumni and of abilities which should be sought in nominees; also, counsel on procedures which will endow nomination with such respect that any alumnus, no matter how great his present responsibilities and demands, will feel moved to weigh sympathetically any invitation to accept nomination which may come to him. Discussion of these matters by groups and clubs should yield constructive suggestions."

In this connection I might add that the Society has never sponsored any trustee nomination, preferring to have such nominations come from clubs or alumni groups in the usual way. Your executive committee has on many occasions endorsed nominees, principally engineers, but last year when no engineers were seeking election we endorsed Miss Mary H. Donlon '20 and Dr. Albert R. Mann '04 both of whom were exceptionally well qualified for the office.

This endorsement is carried in our annual letter which is issued in April and reaches all engineering graduates. It is interesting to note that the engineering college has approximately one-third of the alumni of the University and last year one-third of all the trustees were engineers.

This year there are two engineer trustees whose terms of office expire this Spring. They are Thomas I. S. Boak, ME '14, of New Haven, Conn., and George H. Rockwell, ME '13, of Cambridge, Mass. Both have served well and may be induced to accept re-nomination but at this writing it is too early to make any announcement.

In conclusion let me urge that if you know of any outstanding alumnus whom you think would make a good trustee please send

(*Continued on page 26*)

The College of Engineering

Cornell University

Offers Courses of Study in the Following Fields:

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2. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Civil Engineering.
3. Four-year course in Administrative Engineering in Civil Engineering leading to the degree of Bachelor of Science in Administrative Engineering.
4. Five-year course leading to the degrees of Bachelor of Civil Engineering and Bachelor of Science in Administrative Engineering.

Mechanical Engineering

1. General four-year course leading to the degree of Bachelor of Mechanical Engineering. Options are offered in the senior year in Power-Plant Engineering, Heat Engineering, Industrial Engineering, Automotive Engineering, Aeronautical Engineering, Engineering Mechanics, Metallurgical Engineering, and Mechanical Engineering Design.
2. Five-year course leading to the degree of Bachelor of Mechanical Engineering.
3. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Mechanical Engineering.
4. Four-year course in Administrative Engineering in Mechanical Engineering, leading to the degree of Bachelor of Science in Administrative Engineering.

Electrical Engineering

1. General four-year course leading to the degree of Bachelor of Electrical Engineering.
2. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Electrical Engineering.
3. Four-year course in Administrative Engineering in Electrical Engineering leading to the degree of Bachelor of Science in Administrative Engineering.

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1. Five-year course leading to the degree of Bachelor of Chemical Engineering.

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Ithaca, New York

ALUMNI NEWS

A. M. Hall, M.E. '24

A CORNELL graduate, Archibald M. Hall, has been appointed acting manager of the Eastern division of Vultee Aircraft, Inc., which according to a War Production Board disclosure, will build "a large number of torpedo bombers" for the Navy. The planes will be built in one of the large plants of the Mack International Motor Truck Corporation at Allentown, Pa.; it is estimated by the WPB that the use of this plant will save at least six months in starting production of the bombers.

Before his recent appointment Mr. Hall was manager of the Fort Worth division of the Consolidated Aircraft Corporation.

Mitler Endowment

CREATION of the Herbert E. Mitler endowment fund from a gift of $7,000 has been announced by President Day. This fund, contributed by two brothers, O. S. Mitler and Herbert Mitler, M.E. '08, is to be used for a purpose to be designated within three years after the declaration of armistice in the present war.

Herbert Mitler now resides in New York City and is the owner of an engineering, construction, and real estate firm which he organized in 1916. In 1920, the DeWitt Clinton Alumni Association of New York awarded him a medal for services since graduation.

New Trustee

A CORNELLIAN who has played an important part in the U. S. aviation industry, Victor Emanuel of New York City, has been elected to the Board of Trustees of the University. This action, taken at the mid-winter meeting of the board, places him in the vacancy left by the death of Floyd L. Carlisle.

Mr. Emanuel is president and director of Aviation Corporation, Standard Power and Light Corporation, and Albert Emanuel, Inc. He is also a director in several other corporations.

On the campus, Mr. Emanuel is most remembered as the contributor of the famous Wordsworth collection in the University library. In

Victor Emanuel '18

recent years he has enabled the library to purchase additional books and manuscripts and to publish material based on the Wordsworth collection.

Mr. Emanuel is a member of the Cornell Club of New York and of numerous other clubs and organizations. His hobby is racing and he maintains his own racing stables.

At the present time, one of his two sons, Albert Emanuel II, is a freshman in the Sibley School of Mechanical Engineering.

Paxton Receives Award

A CORNELL alumnus, James L. Paxton, Jr., M.E. '30, has won the "Jaycee" award of the Junior Chamber of Commerce of Omaha, Neb., for contributing the most to that city's development and community welfare during 1942.

At 34, he is president of Paxton-Mitchell, Co., which employs 375 persons in manufacturing metal products essential for the war effort; he is also president of the Omaha Manufacturers' Association. He has been prominent in civic activities, especially Boy Scout work, for the past 15 years, and is a member of the Cornell Alumni Association.

Cornellian Commissioned

SECOND Lieutenant Edwin W. Genetive, M.E. '34, Infantry, Great Neck, Long Island, has arrived here for duty with the 11th Armored Division, commanded by Major General Edward H. Brooks.

Lieutenant Genetive, assigned to the 41st Armored Regiment, received his commission upon graduating from the Armored Force Officer Candidate School at Fort Knox, Kentucky. He was a corporal when, in October of last year, he was selected to attend the school. From 1930 until 1934 he was a student at Cornell and earned the degree of Bachelor of Science in Administrative Engineering.

E. W. Roberts Writes Article

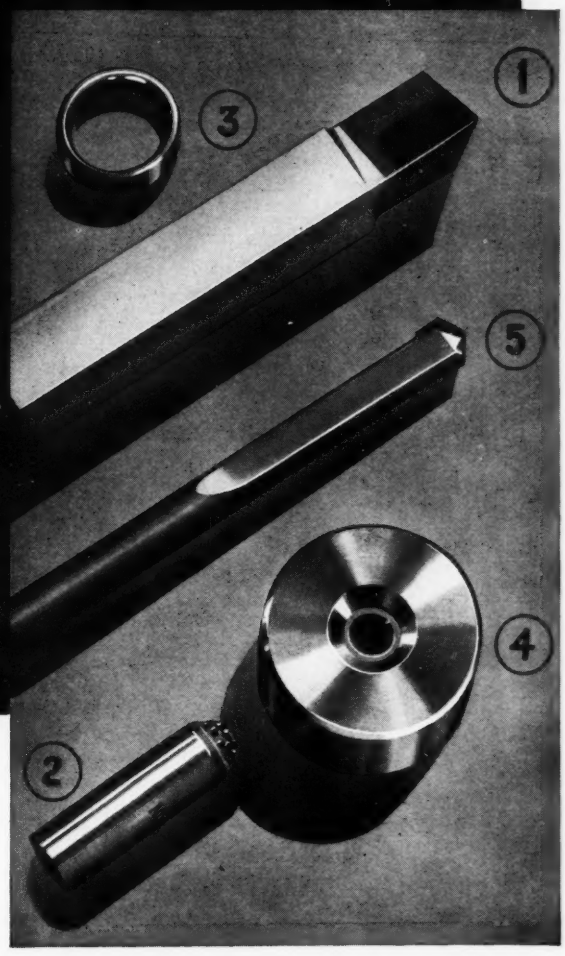
How a Cornell undergraduate in the 1890's wrote a letter to the great inventor, Hiram Maxim, and became his assistant in constructing what he still insists was the first airplane to make a flight under its

(*Continued on page 26*)

Use The Cornell University Placement Bureau

WILLARD STRAIGHT HALL — H. H. WILLIAMS, '25 Director

These are the 5 WAYS in which industry is stepping up WAR PRODUCTION With Carbides



1. Cutting Metals Faster! . . . Carbide tools commonly double the volume of metal removed per hour. Cut wide range of material, from "tough" armor plate to "soft" plastics. Continuous or interrupted cuts. Adaptable to most old machines, as well as new.

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"Loose Juice"

By BOB GARMEZY and ED RICH

LAST term the average senior had 19 hours including an EE lab and a communication lab. With two labs due a week and 15 hours a conservative estimate for a lab, the total is 30 hours a week on labs plus 5 hours a week for performing the experiments. The remaining 12 recitation hours demand 2 hours preparation apiece (it says in the University catalogue) making a total of 36 hours in a class or in preparation thereof. The grand total is 71 hours plus 3 hours commando and drill. Some people demand a 40 hour week *with* pay!

* * *

ATTENTION EE's

The Sibley Constant has now been officially replaced by the Franklin Fudge Factor.

* * *

And then there was the moron who went thru a screen door and strained himself.

Also we have the moron who was feeling low and got his face slapped.

* * *

Daffynitions

Standard Cell—The average room in a prison.

Terminal Lug—A bum in a railroad station.

Resistance—What the company puts up when you want a raise.

Ohm—Where everybody goes at four o'clock (Except from EE Lab).

Balanced Bridge — Symmetrical teeth.

Slide Rule—A way to look busy.

Low Range—A kitchen stove with short legs.

Magnet—A soft bodied, grublike footless larva of an insect usualy living in decaying matter.

Center tap—Spigot on the middle barrel.

Soft Copper—A good natured policeman.

Steam—Water gone crazy with the heat.

Toggle Switch—Persuader for small children.

Sweep Circuit—Path traced by a vacuum cleaner.

Volt—Something cast for Roosevelt every four years.

Our fellow culprits include Dick Demmy, Dean Wheeler, and C. B. Moore, M.E. '24 who has a novel conception of electrical terms. It looks as though Mr. Moore's contribution is the closest the ME's will ever get to writing a page of their own for the ENGINEER.

How about something from the classes of '45 and '46? Prof. Cotner's box has plenty of room for your contributions.

Oddity

In 4754 we find a group of five men building a receiver and of the five men, four are power men. The other man is a communcations man and his assignment is to build the power pack! Such is life.

* * *

This one is told of a noted Cornell professor. It seems that whenever one of his students wants something, but hasn't a ghost of a chance, he calls the hopeful student into his office and tells this one: "Once upon a time there were two snowflakes, and as they fell, they landed on the top of a high mountain. They started to roll down the mountain, and, as is always the case, they formed larger and larger snowballs. At the foot of the mountain they fell in a deep mine, and the two, by this time pretty large snowballs, kept right on. As they fell for quite a while, it became warmer and warmer, the two snowballs saw two red spots before them. As they approached the two spots they saw that they were two red hot doors with a little man dressed in red with a pitchfork in his hand beside them —you can see that the two snowballs were pretty deep by now. Unable to stop, the snowballs rolled right through the doors, and after they passed, they heard them shut. Well, Jones, you have as much chance as those two snowballs have.

Finals Week Story

From the grapevine telegraph we hear of a student who was somewhat high when he went in to take one of his finals. He knew the answers to all the questions (In spite, or as a result of?) and proceeded to scribble like mad for the duration of the exam. He left the final quite pleased; but, alas, his paper was returned with a red 0. He had forgotten to turn the pages in his prelim book and a solid graphite deposit was the result!

* * *

Purgatory

(*Cornell Version*)

Mech. lab. has started again it seems,
Oh, woe are you and I.
After a weekend of parties and dreams
Our leisure is shot to the sky.

With relief we finished our final exam;
We thought we were through with this crap.
Now for four more long months we must worry and cram.
For we're caught in J. Moynihan's trap.

In the lab till four-thirty we play with the junk,
Taking data—what for we don't know.
For the next seven daze we decipher this bunk.
While we let all our other work go.

Our Franklin Hall subjects we'd study with joy,
If only we had enough time.
But along comes a Mech. lab. our marks to destroy,
And prevent intellectual climb.

The reason we take it is still well concealed;
We gain from it nothing but strife.
Our bodies are weakened; our brain are congealed.
It's the curse of an EE's life!

Engineers who know their bearings are helping to win the war. Take a tip from them for your future's sake.

No matter how well a machine is designed in other respects it cannot operate with maximum efficiency if its bearings are unequal to the tasks assigned to them.

For example, friction elimination is only one function of bearings in modern mechanical equipment. Equally imperative and important are ability to carry and control radial loads, thrust loads and any combination of them; to hold moving parts in correct and constant alignment; and to adapt themselves to any condition of application without the slightest reduction of efficiency in any respect.

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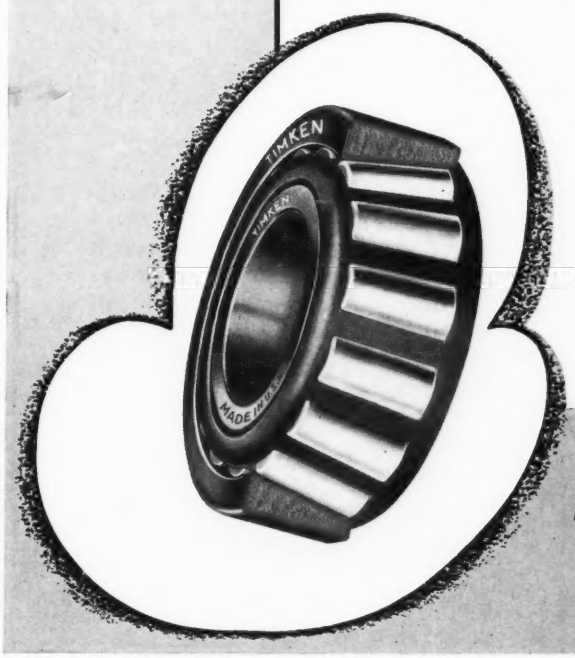

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The Engineer Comments

New Blood

With the publication of this issue a new group of students assumes the responsibility of presenting to the readers of the Cornell Engineer what they like to read and of presenting it to them in a manner which will be pleasing to them. We take over in a time characterized by uncertainties. We intend to justify our existence in three ways. First, we shall keep our readers informed of the policies of our University at war; next, we shall keep our readers informed concerning the works of alumni associated with the war; and lastly, we shall present to our readers engineering developments related to the war interpreted by alumni, faculty, and undergraduates.

We call attention to the time of school year at which our election has taken place. The senior boards of our magazine considered this new plan at length and decided it was the fair time to elect new boards due to the fact that accelerated students might otherwise miss the opportunity of holding responsible positions on the magazine. We commend the work they have done to improve the magazine's content and make-up. Thanks are in order for their work and for their thinking of our interests in electing us at this time.

CE's, A Challenge

The undergraduates in the School of Civil Engineering, alone among the many students of our University, are presented with the problem of upholding their personal honor each time they take part in any curricular activity. Is such a plan, as set forth in the Honor Code of the School of Civil Engineering, too idealistic to produce its intended effect?

The honor code was not drawn up to incite professors and amuse the students. It was not expected by its authors to eliminate all unfairness and unauthorized co-operative effort, which took place before it was composed, among the student body. It was presented to and accepted by a group of students of a former generation who felt that through the responsibility it placed on them they could become better students, better men, and more worthy representatives of their school. They felt that their education should include in addition to the fundamentals of engineering a means of developing their ability to accept personal responsibility. They also felt that this opportunity for character development would come to the fore in their dealings in later life, reflecting back on this institution and so benefiting both themselves and Cornell.

From the time of its adoption up to the present day, the Honor Code has justified its existence. It has met each challenge to its effective-

(*Continued on page* 34)

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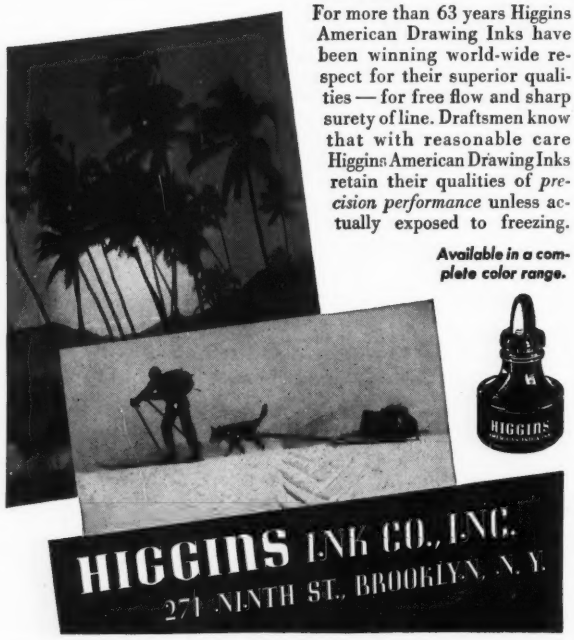

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29. Roth, E. R.
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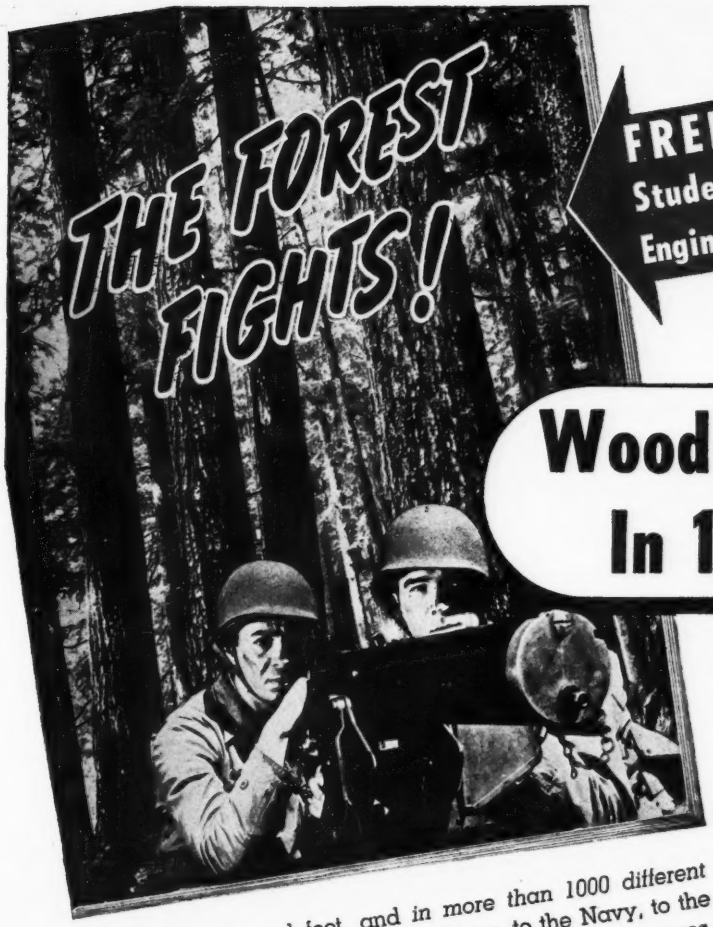

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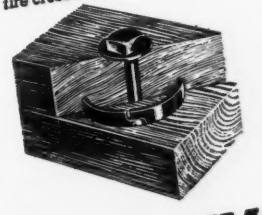

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E. W. Roberts

(*Continued from page* 18)

own power, is told in a recent article in the Cincinnati Enquirer. The engineer is Edmund W. Roberts of Cincinnati, who received his M.E. degree from Cornell in 1895.

As chief assistant and designer for Maxim, Roberts recalls that he took part in the construction of a steam-powered airplane which made a short flight on July 31, 1894, more than nine years before the Wright brothers made their first flight at Kitty Hawk. Roberts was a student at Cornell and had just written his article on "Aeronautics" when he read an account in a magazine of Maxim's flight experiments. He wrote to Maxim and asked for permission to work with him for part of the summer; this permission was given.

Maxim's machine was described by Roberts as being a biplane with 4,000 square feet of lifting, or wing, surface and a spread of 104 feet. It was powered by two steam engines of 160 horsepower each. The propellers of the machine measured 17 feet 10 inches, making them longer than those on the recently completed giant Mars flying boat. It weighed 7,800 pounds, or nearly four tons. For a long time after airplanes came into use it was the largest ever built.

Steam engines were used because it was not until the development of the automobile that light engines suitable for airplanes were available. According to Roberts, even the early automobile engines were too heavy, for they weighed as much as 20 pounds to a horsepower. Maxim's power plant, including the boilers, weighed but 10 pounds to a horsepower.

The plane was wrecked during a trial flight in which it traveled 200 feet off the ground. Maxim's backers decided that the money which they had put into the enterprise was all they cared to contribute; so the project was dropped. The machine was placed in the Kensington Museum in London, England.

After Maxim had discontinued his experiments, Roberts went to Germany to visit another aviation pioneer, Otto Lillienthal, who was experimenting with gliders.

A consulting engineer for the National Advisory Committee for Aeronautics during World War I, Roberts was also associated with his brother in the Roberts Motor Company, Sandusky, Ohio, one of the nation's leading aviation motor manufacturing companies in the early days of flying. He has designed 130 different types of motors for automobiles, boats, and airplanes.

Roberts relates that the first parachute jump in history was made from an airplane powered by one of his motors. The jump was made at St. Louis on March 12, 1912, by Captain Bert Berry. The plane was piloted by Anthony Jannus.

A member of the National Society of Automotive Engineers, Roberts worked as a designer of automobiles for a number of years, beginning nearly 40 years ago when he was employed by the now defunct Elmore Manufacturing Company, Clyde, Ohio. In 1903, the year he started to work for them, that company built and delivered 108 automobiles, Roberts said.

Roberts also served as editor of the *Gas Engine* magazine, which was published in Cincinnati for a number of years, and is the author of the *Gas Engine Handbook,* a manual for the operation of gas engines, as well as seven other books on the same subject.

Address By Parker

AMERICAN industry has asked the War Manpower Commission to provide 6,000 graduate engineers because "a production army cannot be maintained without new recruits," according to James W. Parker, M.E. '08, who is president of the American Society of Mechanical Engineers. Mr. Parker, vice-president and chief engineer of the Detroit Edison Company, made the statement in a recent address at the annual meeting of the Society in New York.

Because of the great need in the future for men with broad training in the fundamentals of technology, Mr. Parker urged students who are about to enter the armed services to finish their education after the war.

Mr. Parker revealed that in the last year he has visited sections and student chapters of the Society in 29 states and in several Canadian provinces. "I found men everywhere in a thoughtful mood," he said. "This is true not only of the more mature members, many of whom are actively engaged in adapting industrial production to the requirements of war, but it is true also of the younger men in the Society's student branches. Everywhere in America I found a spirit of unity among all the racial groups of which the nation is composed. The American people are confident of the outcome of the war and are determined to play their part in the post-war world."

Voice Of China

A FORMER Cornell graduate student, Fung Chien, is now chief engineer for Station XGOY, "the Voice of China", at Chungking. After attending Cornell in 1921-22, he took a special course at the General Electric Company. Fung then returned to China and became professor of engineering at Central University, Nanking.

Before the outbreak of the Pacific war, low-powered XGOY was rarely heard or listened to abroad. The war immediately catapulted the station into the world's limelight. Today, with increased power, the station is on the air daily, 10 a. m. to 4 p. m., and 7 p. m. to midnight, (Greenwich Time), broadcasting in all languages

President's Message

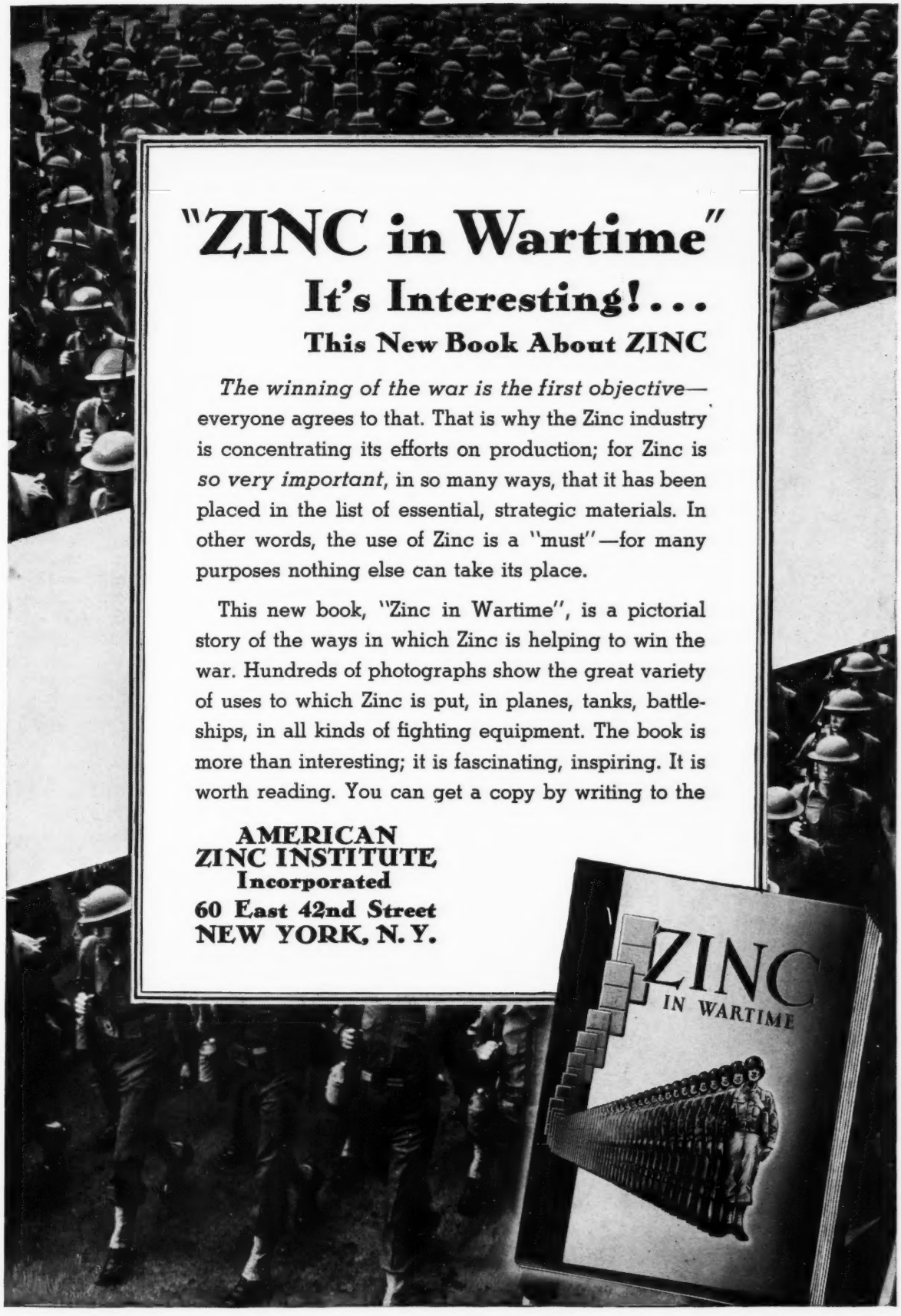
(*Continued from page* 16)

his name with qualifications to Newton C. Farr, chairman of the Nominations Committee, 69 West Washington St., Chicago, Ill. Also remember that any alumnus has the right to be nominated, provided his nomination is sponsored by ten or more alumni. Such a communication should also be sent to Mr. Farr. I trust that there will be a number of nominations.

This year, more than ever, we need well qualified men and women on the board of trustees, those who will give the position the attention which it deserves and you can help by giving the subject your serious consideration.

Yours sincerely,

GEORGE N. BROWN,
President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It's Interesting!...
This New Book About ZINC
The winning of the war is the first objective—everyone agrees to that. That is why the Zinc industry is concentrating its efforts on production; for Zinc is so very important, in so many ways, that it has been placed in the list of essential, strategic materials. In other words, the use of Zinc is a "must"—for many purposes nothing else can take its place.
This new book, "Zinc in Wartime", is a pictorial story of the ways in which Zinc is helping to win the war. Hundreds of photographs show the great variety of uses to which Zinc is put, in planes, tanks, battleships, in all kinds of fighting equipment. The book is more than interesting; it is fascinating, inspiring. It is worth reading. You can get a copy by writing to the
AMERICAN ZINC INSTITUTE Incorporated
60 East 42nd Street
NEW YORK, N. Y.
ZINC
IN WARTIME

Rings Around New York

(*Continued from page* 11)

Parkway; or from the Queens side of the Bridge, one may take the Whitestone and Grand Central Parkway to Manhattan via the Triborough Bridge.

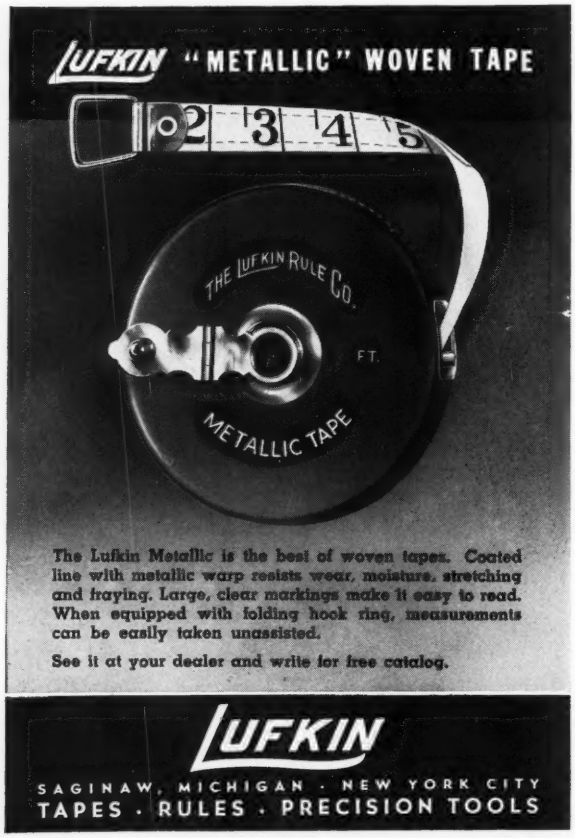
The Gowanus Parkway is an elevated highway which may be included in the Belt Parkway System. It connects the Shore Parkway with the Brooklyn-Battery Tunnel (under construction) by way of Third and Hamilton Avenues. A part of this parkway was built on an abandoned elevated railroad structure, thus saving some money. The pillars had to be strengthened and some of the foundations improved. As the old "El" structure did not permit more than four lanes of roadway, the entire highway along Third Ave. was constructed to accomodate only this amount of traffic. The rest of the highway is carried on an elevated structure of unique design. Instead of the usual pillars supporting the highway at its edge, there is a central row or arch shaped supports, or

Gowanus Parkway

steel bents holding up the cantilever arms upon which the roadway is built. A 180 foot right of way was cleared along Third Ave., and since the supports only occupy 26 feet of the street width, Third Ave. was widened to include a 62 foot roadway and a fifteen foot sidewalk to each side of the elevated structure. This broad thoroughfare serves a part of the Brooklyn waterfront. The Gowanus Parkway crosses the Gowanus Canal, from which it derives its name, on a fixed high level bridge. This is a continuous girder with a maximum span of 216 feet.

The results of this extensive highway building program are many. First of all, it offers a chance to by-pass the City without having to wind through congested and tortuous streets. Then, too, it offers a convenient method for reaching one part of the City from another. Moreover, many blighted areas have had their faces lifted, and quite a number of new recreational parks have been made available and others rehabilitated. Furthermore, the "Rings Around New York" have considerable military value in the transportation of troops and supplies, and in the defense of the City.

New York's program for express highways is far from complete. The Post War Program includes plans for the completion of the Brooklyn-Queens Connecting Highway, for the Narrows Tunnel to Staten Island, the Midtown Manhattan Underpass, and many others.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C. M. DOYLE '02, *Headmaster*

This "Carrot" means healthy metals

YOU CAN SEE why metalworkers call this lump of calcium metal a "carrot." This is the way it looks when it comes from an electrolytic cell in which it is made.

Calcium is a soft, silvery-looking metal. Although it is abundantly present in such common materials as chalk and limestone, its recovery as a pure metal is extremely difficult. Yet it is vitally essential to this country.

In the making of stainless or high-alloy steels, calcium drives out impurities, giving cleaner, better steel for casting or rolling. In magnesium casting, small amounts of calcium improve the finish of the surface and minimize scaling. Calcium is an essential in the making of many metals.

This hitherto rare metal has been made in this country only during the past few years. Before Europe exploded, the United States was dependent upon France as a source of supply.

But back as far as 1935, thinking that this country should have a domestic source, ELECTRO METALLURGICAL COMPANY, a unit of UCC, started a major research program. After four years of work . . . as French supplies dwindled . . . a plant was put into operation for the manufacture of the gray metal. Today, ELECTRO METALLURGICAL COMPANY produces many times as much calcium metal as this country ever imported . . . and production is increasing.

IN THE AIR SOONER! Vital aircraft parts flow from production lines quicker because the use of calcium metal results in better metal.

BETTER HEALTH! Pure calcium metal is used as a drying and purifying agent in the manufacture of certain new disease-fighting drugs.

CHEMICAL HELPER! Calcium is necessary in making a number of rare metals—many of which heretofore were unavailable commercially—and all of which are vital.

METAL-SAVER! In the melting of copper scrap for use in certain types of electrical equipment, calcium is used as a purifier and a restorer of electrical conductivity.

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CHEMICALS — PLASTICS

College News

(*Continued from page* 13)

other rubber products.

Tin plating by a process of electroplating combined with reflowing of the metal has brought about a saving of 150% in the use of tin. Prodigious leaps have been made since the time when diversion of the tanker to more essential work brought the Eastern states to their present chilled condition. At present the longest pipe line in the world, 850 miles, stretches from Louisiana to North Carolina. Private industries working together completed the mammoth structure in a period of 180 days. Thirty pumping stations and sixty pumps are features of this engineering feat. A still larger project is underway, a pipe line which will cover 1388 miles, be operated by 125,000 horse power, and pass 300,000 barrels of oil per day. As many as eight different products can be carried in the pipe line simultaneously without risk of mixing them.

The automobile which the motorist has safely stored away for the duration should return a rejuvenated vehicle. Instead of the old 70 octane gas employed in the past, the 120 octane used by the airplane will be available to the public.

As for the problems arising from the war, there are an equal multitude of these to baffle the minds of the nation's leaders. For, with the termination of conflict, once again the vast markets of the world will be reopened. The United States, the richest nation on earth, must be the chief purchaser in order to establish economic equilibrium throughout the world. What then will be the outcome of these new industries and production lines so carefully nurtured by our government?

To this Mr. Powel likewise offered his suggestions. This time, the economic ills of the world must be considered at the war table. The United States, because of her natural richness and technical prowess, must lend the other nations her technical skills. With this in mind, he pointed out that by raising the standard of living of the other countries, we would improve our own standard of living. Finally, in what seemed to epitomize his speech, Mr. Powel stressed the fact that success in the project lay in international trade and international responsibility.

Scholarships Announced

To aid a select group of outstanding secondary school students to secure special preparation for military service or war industry, Cornell University will again offer 30 or more John McMullen Regional Scholarships in Engineering to men qualified to enter the College of Engineering in June or September. These scholarships pay up to $200 each term, normally $400 a year but now $600 a year if the student elects the three-term accelerated program.

To students under 18 years of age who are qualified for later military service the course in engineering, even if pursued for only a term or two, will offer the opportunity to establish aptitude for technical study, and will probably give them the chance to do further technical work with adanced standing under the specialized Army and Navy training program, according to officials of the College of Engineering.

These scholarships are offered annually in 15 districts covering all the United States except the State of New York, where other scholarships offered by the state are available. Awards are based on character and general ability, as well as upon academic distinction. Applications must be received by March 1st, and candidates who receive final consideration are required to take the Scholastic Aptitude Test of the College Entrance Examination Board. Application blanks have been distributed to high school principals and to headmasters of preparatory schools throughout the country, and may be obtained either from them or from the Chairman of the Committee on Scholarships, College of Engineering at Cornell University, Ithaca, N. Y.

Fields of study open to applicants include Chemical, Civil, Electrical, Mechanical and Administrative Engineering.

Women In Industry

Expanding opportunities and the need for more trained women in war industries were cited recently by Prof. Walter L. Conwell, director of the Engineering, Science, and Management War Training Courses at Cornell, in announcing the University's spring program of courses for men and women in industry in 15 upstate cities.

America's war industries, he said, will need hundreds of thousands of additional women workers this year if the nation's war production goals are to be reached.

"The need for trained women is becoming acute. Industrial organizations and Government agencies concerned with war production are desperately searching for women qualified to take jobs as draftsmen, tool designers, junior engineers, inspectors, test engineers, radio technicians, safety engineers, office and production supervisors, and many other jobs that require some technical knowledge as well as special skills.

"No woman who has completed high school and has any aptitude for mathematics and physical science should be content to serve as an unskilled laborer in a machine shop. There are far more important jobs for her to do."

High school graduates in the Southern Tier counties and in the western part of the state are among those eligible to take the war training courses offered by Cornell University in cooperation with the U.S. Office of Education, Professor Conwell said.

All courses started the week of February 15 and will continue for 16 weeks. There are no tuition charges. More than 12,000 men and women have been enrolled in previous ESMWT courses since the start of the program late in 1940.

CE's Celebrate

A big going-away party and banquet was organized for all of the senior Civil Engineers. It was held the evening of Wednesday, January 27, in Zinck's lower deck. The whole program was a spontaneous one with various members reviewing the past of the Class of '43, Civil Engineering.

(*Continued on page* 32)

SALVAGING VITAL PRODUCTION TOOLS

Worn metal teeth no longer shelve the Tool — nor do they mean costly, hard-to-get replacements. Utilizing the intense heat of the oxyacetylene flame, the Airco Hard-Facing Process quickly "builds-up" the worn metal. Parts thus rebuilt can be expected to out-live and out-produce new parts.

Airco Hard-Facing is doing an unprecedented job today in conserving time and material. Parts of practically any shape and size, which are subject to abrasion, can be rebuilt economically, speedily. Standard oxyacetylene welding apparatus is employed.

Many other applications of the oxyacetylene flame are finding ever widening use in speeding and improving production of ships, tanks, guns, rolling stock and planes. This versatile tool slices through steel with remarkable speed — welds metal into strong, light units — sweeps surface rust from metal structures to extend the life of paint jobs — gouges steel and iron quickly and accurately.

"Airco in the News" shows many interesting uses of the oxyacetylene flame and electric arc. Write for copy.

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Ice And The Airplane

(*Continued from page 7*)

system ice accumulates to the point of substantial blocking, thereby reducing engine power and exhaust heat to the point where it can no longer cope with the icing situation, an emergency method of ice elimination must be available. This is provided in the form of direct alcohol injection to eliminate the ice, restore the engine to operation, and make available the necessary heat to continue engine ice prevention by the conventional heat method.

There are, of course, many other low-temperature problems affecting the airplane and its operation, commonly classed under the heading of "winterizing problems". The development of knowledge concerning all these problems has been greatly accelerated by extended operation and the rapid accumulation of experience by the military services and by the airlines performing military missions. We can confidently look forward, at a relatively early date, to the solution of all the problems incidental to winter operation. The airplane is, in many ways, more susceptible to these low-temperature problems, but fortunately, the very elements which contribute to the airplane's success as a high speed vehicle also tend to reduce the extent of the flight problems and leave us with only the ground problems which are essentially the same as those being solved in all other fields of transportation.

College News

(*Continued from page 30*)

Rod and Bob is the sponsor of an interclass sports program which they expect to launch this term. In the CE School each class will play every other class in football, basketball, and baseball. Winners of games will be awarded points, and the class with the most points will have its name placed on a trophy cup.

Chi Epsilon, in the very near future, will have a meeting during which they will have a constructive discussion and criticism of the present Civil Engineering curriculum.

Conta Advanced

LEWIS D. Conta has been advanced from instructor in experimental engineering to assistant professor of engineering materials under the E.S.M.W.T. program, according to a recent announcement by President Day. Thomas B. Sear has been appointed as instructor in structural engineering in E.S.M.W.T., and Wolfgang Sternberg was appointed Westinghouse research associate in electrical engineering.

A leave of absence was granted to Professor Lynn A. Emerson to cooperate with the Air Service Command in its educational program.

Professors Collaborate

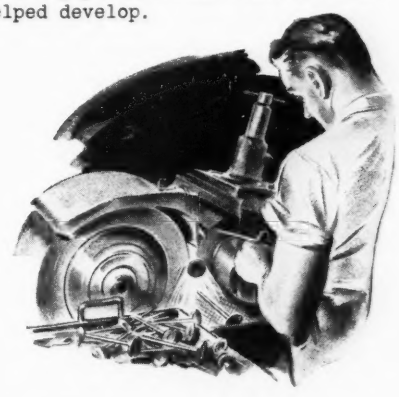
AMONG the many bulletins published by the Cornell University Engineering Experiment Station, was one recently put out which aroused an unusual amount of interest. The paper, written by Prof. Ellenwood and Messrs. Kulik and Gay, deals with "The Specific Heats of Gases Over Wide Ranges of Pressures and Temperatures."

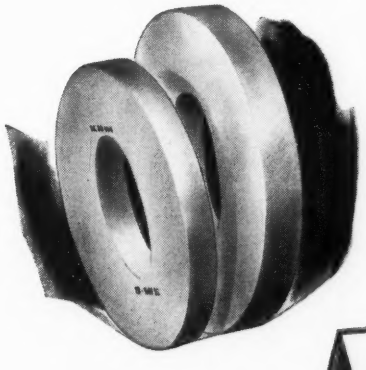
This paper represents an attempt to supply the information that has been lacking by a series of curves. The demand for it has far exceeded the normal demand for these publications, and a new printing will soon come off the press.

What's the hottest spot in a Dog Fight ?

A pilot may keep cool in a "dog fight"—but not his engine! And to function smoothly at high engine temperatures all moving parts must be ground and finished with split hair precision. And that's where Carborundum comes in. For instance, the valve stems are ground to the required accuracy by a centerless grinding process which Carborundum helped develop.

The centerless grinder grinds the valve stems to an accuracy of five ten-thousandths of an inch. Does it, too, in half the time other finishing methods would require. Carborundum has led in the development of centerless grinding wheels to speed the output of valves, pistons, shafts and other such parts that go into a plane.





Industry at war is finding new uses for grinding wheels and other abrasive products...Weapons for Production...every day. When you get in the field and encounter a production problem which abrasives might solve, write The Carborundum Company, Niagara Falls, N. Y.

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ABRASIVE PRODUCTS

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H. H. Williams

(*Continued from page* 14)

thority. After assisting with the Goethals Bridge and the Bayonne Bridge, he returned to Ithaca. Given free rein with his organizing ability, he went to work and established the University Placement Bureau in 1932. As if this was not enough, he undertook to do graduate work in regional planning. The responsibility of the Placement Bureau grew and the time for grad work dwindled. The verdict went to the Placement Bureau, and he has guided its existence from its inception up until last spring. At that time, Mr. Williams was appointed Assistant to the Dean in the College of Engineering, in which capacity he is now serving.

A sailor at heart, he has been and is at present commodore of the Ithaca Yacht Club. In his spare time, he gets in all the sailing he can on the lake. As a matter of fact, last summer, before Dr. Adams was summoned to active duty, the two used to take frequent sails in a ketch they jointly owned on the lake. Now that winter has taken over the scene, he has built a playroom in his house, which is 100% occupied by the Navy on Saturday evenings.

Wally Seeley

(*Continued from page* 15)

the reward for effort well directed. This fellow is really modest.

He still has that go-West lust. During the summers following his frosh and sophomore years, he ventured up into the wilds of Maine, to become a counselor at a boys' camp. And in his spare time, ever since he and his family took up living in Syracuse, he has done some brisk mountain-climbing in the Adirondacks. The Adirondacks, for the information of those foreigners living outside New York State, is a formidable range of mountains in the northern part of the State. Among the more perilous peaks is Mount Marcy—Wally, just to be different, has twice tackled it with success. The idea of mountain-climbing buzzed into his head after the family had taken several trips through the Smokies. The smoky idea also was prevalent last summer, when he was in the employ of the Crucible Steel Company of America in the engineering department.

Now Wally's on the home stretch. Assuming he graduates, he will continue his trek eastward undoubtedly, for he is in the R.O.T.C. Field Artillery. (Graduation is left to the decision of the Government, and the doubt expressed above is not to be construed as a reflection on the ability of Mr. Wallace Seeley.)

Editorial

(*Continued from page* 22)

ness and is substantially the same as originally adopted. The Honor Committee was not set up for the purpose of persecuting certain individuals in the School. The formation of such a committee was seen as one of the fair means of enforcing the code. It gives the students final and complete control. We, through recognition and acceptance of our responsibility, can make the continuation of the honor code possible. The Honor Committee deals justly with every case presented. Our duty is to make their dealings as few as possible.

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Today when you look at a modern Busch-Sulzer Diesel, you know you've got something; simplicity of design, rugged construction . . . *assured performance.* You know that you are off to a good start . . . with long years of dependable service ahead—with operating and maintenance costs remaining at lowest levels.

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In the rebuilding that will begin with final victory, Busch-Sulzer Diesels will play their part faithfully. Meanwhile, all of our facilities are devoted to 24-hour production of equipment for the Navy and for orders of high priority only.

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STRESS and STRAIN...

She was just an optician's daugh ter—two glasses and she made a spectacle of herself.

* * *

"Here is a letter from your wife saying you are the father of a ten pound baby."

"Does she say anything else?"

"That's all, except at the end of the letter she says, 'Truly yours',"

* * *

And then there's the miniature cocktail—one drink and in a minute you're out.

* * *

"Mrs. Clancy, yer child is badly spoiled."

"Gwan wid yez."

"Well, if you don't believe me, come and see what the steamroller just did to it."

* * *

"Let's get married or something."

"We'll get married or nothing!"

* * *

Anyone can play bridge, but it takes a cannibal to throw up a hand.

* * *

Engineer: "How about a date tonight?"

Coed: "Sorry, I can't go out with a baby."

Engineer: "Oh, excuse me, I didn't know."

* * *

Country Constable: "Pardon, Miss, but swimming is not allowed in this lake."

Modern Miss: "Why didn't you tell me before I undressed?"

Constable: "Well, there ain't no law against undressin'."

* * *

"The Sultan's son is apt to be a bit wild."

"Harum Scarum, eh?"

"No, he's used to them,"

First little pig: 'My, my, I never sausage heat!"

Second little pig: "Me neither. I'm nearly bacon."

* * *

"So I told the freshman to indorse the check his family had sent him."

"Did he do it?"

"Yes, he wrote on the back, 'I heartily indorse this check'."

* * *

He: "Gosh, it's dark in this parlor; I can't even see my hand in front of me."

She: "That's all right, I know where it is."

* * *

There is an engineer on this campus who never takes a drink.

You gotta hand it to him.

* * *

He: "Did you bake these biscuits with your own little hands?"

She: "Yes, why?"

He: "I just wondered who in hell lifted them off the stove for you."

* * *

He: "Dear, this is Heaven."

She: "Well, I' mno harp."

* * *

"I've never been kissed before," she said as she shifted gears with her knee.

* * *

"I had to change my seat several times at the movie."

"Gracious, did a man get fresh?"

"Well, finally."

* * *

Father: "Did you say you're putting on weight, daughter?"

Coed: "I sure am, Dad. The other day I weighed 125 stripped for gym."

Father: "Who the hell is Jim?"

"And where is Cadet Smith?"

"A. W. O. L."

"What do you mean by that?"

"After women or liquor."

* * *

Sign near a Service Station: "No smoking near gas pumps, please. Maybe your life isn't worth saving but gasoline is."

* * *

Old Lady (to little boy smoking): "Don't you know that if you do that you'll never get to be President?"

Little boy: "That's all right, lady, I'm a Republican."

* * *

Sorority Pledge (to housemother): "Mrs. Blivis, do all the fairy tales begin with "Once upon a time'?"

Housemother: "No, my dear, most fairy tales start with, 'I'm going to the library tonight'."

* * *

Her lips quivered as they approached mine. My whole frame trembled as I looked into her eyes. Her body shook with intensity as her lips met mine, and I could feel my chest heaving, my chin vibrating, and my body shudder as I held her to me.

No, I should never have kissed her in a Ford with the motor running.

* * *

Beach Censor: "My dear young lady, I don't like to trouble you, but I do object to your bathing suit."

Coed: "I know. You men are all alike, but they won't let me bathe without it."

* * *

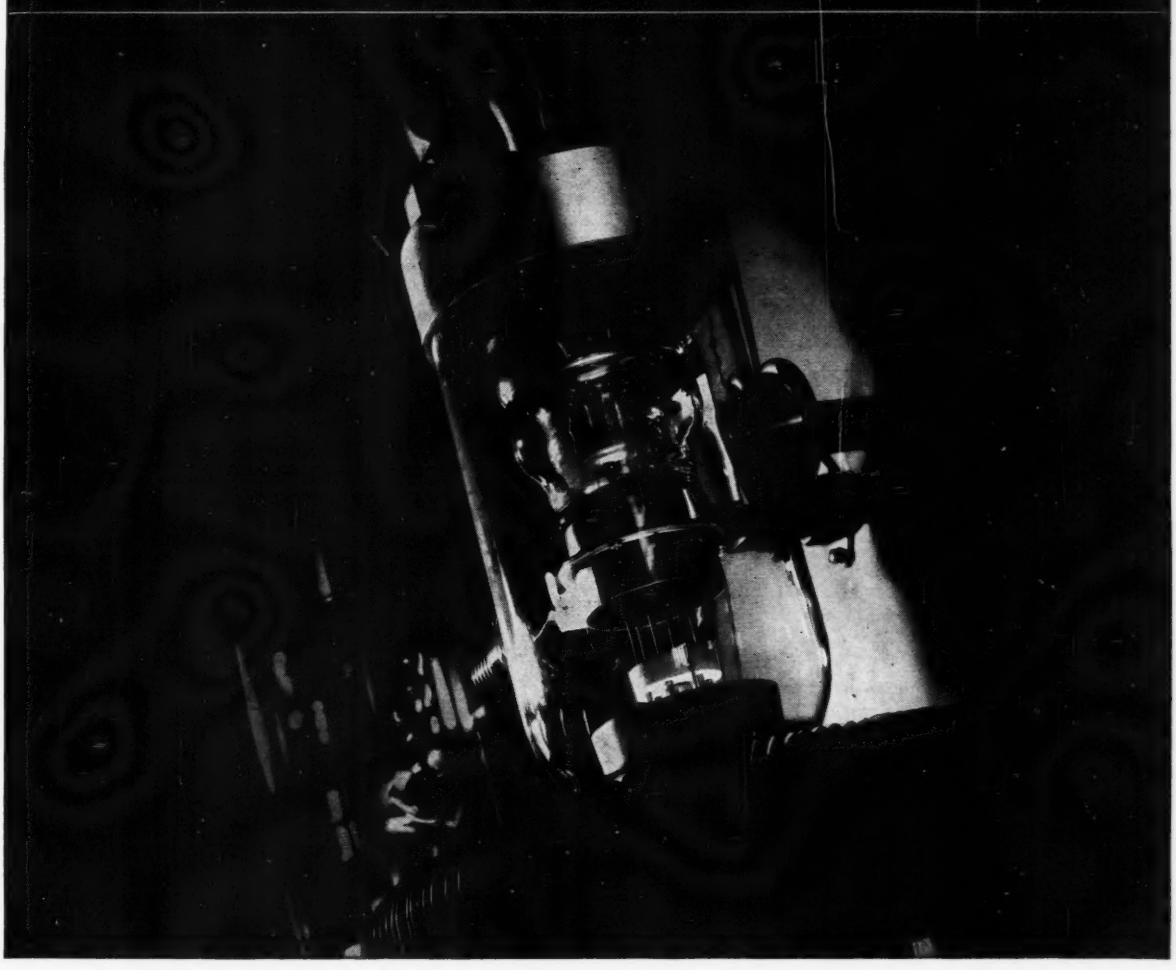
Lady: "Who is that coal for?"

Coalman: "This coal is for Mr. Zell."

Lady: "Why, that's fine, I'm Gladys Zell."

Coalman: "So am I."

This is Fred Allen's horse...



EVER wonder how Fred Allen manages to ride into millions of homes every week and emerge life-size and full-voiced from radio loud speakers?

The "horse" he rides is a big radio transmission tube like the one shown above. One reason it carries him smoothly and without interruption is that Corning research has perfected a glass for radio tubes that will stand heat and voltage of modern transmission.

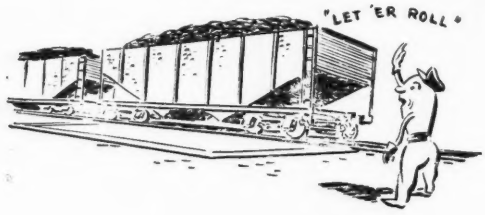
Corning furnishes glass for the tubes in your own radio set, too. Just as it furnishes glass for many of your lamp bulbs; for the Pyrex cooking utensils in the kitchen back home. But to many, and particularly to the man who is making engineering his life work, Corning research is most interesting because of the things it has discovered that glass can do in competition with other materials, and do better. Glass springs, for instance, that apparently never tire out. Glass acid pumps that replace valuable metal alloys and give longer service in the bargain! Glass piping, and valves, nuts and bolts that resist chemical attack. Every day Corning is working on ways in which glass, still fairly plentiful, can be used to replace metals that are vital to war industry.

Glass is important today. And as more is discovered about this remarkable material, no one can predict the boundaries of its usefulness. For instance, glass precision gauges (ring, plug and others) are now being produced that are in many ways superior to ones made of steel.

As you get further into engineering, keep an eye on glass. The greatest things in glass are yet to come. Corning Glass Works, Corning, N. Y.

CORNING
means
Research in Glass

G-E Campus News



LET HER ROLL!

AT A PLANT of the Hanna Coal Company in Ohio, loaded coal cars are emptied by being rolled onto a rotary dump, fastened to the rails by a mechanical device, and then rolled upside down over a chute.

Now the dump is not supposed to revolve again until the empty car has been righted and sent on its way. But once in a while, when a car took a particularly long time to move off, the dump would revolve the next full car and derail the empty one.

The difficulty was remedied when a G-E photo-electric relay and light source were installed on opposite sides of the track at the "empty" end of the dump. Now the dump can't revolve so long as the light beam between the light source and the phototube in the relay is blacked out by the body of the empty car.

NOTHING TO IT

HERE'S how the G-E supercharger works—à la Hollywood.

In Warner Brothers' "Desperate Journey," a Nazi officer asks a captive American flyer, "How do you manage to supercharge the engines at the extreme cold of these high altitudes?"

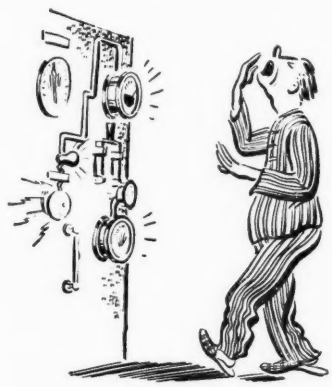
Johnny, the prisoner (played by Ronald Reagan) is crafty. He stalls a bit and then, assured that no one can overhear, he whispers, "It's done with a thermo-trockle."

"A what?" The awed Nazi leans closer.

"A thermotrockle amfilated through a daligoniter," explains Johnny, beginning to sketch with his left hand.

"You see, the dornadyne has a frenicoupling and the amacmeter prenulates the kinutaspel hepulace—here—and the—."

All of which thickens the plot, confuses the Nazi, and gives Johnny an opportunity to slug his guard and escape—without revealing a single military secret.



TESTING

BACK when Herbert Hoover was in the White House, four specimen rods of an alloy steel used in steam turbines were imprisoned in a thermostatically controlled electric furnace at one of the G-E laboratories.

The purpose was to study the effect on the metal of prolonged high temperature and stress, in order to improve the design of the turbines.

Usually these "creep" tests are run for only 1000 to 3000 hours, but the engineers never took these four specimens out of the furnace until the other day—thus obtaining what they believe to be the first data based on a 100,000-hour test.

Throughout the 100,000 hours an ingenious alarm system guarded the specimens. In the event of trouble, a red light would flash and a bell would ring, summoning a watchman who could get one of the engineers out of bed to remedy the situation.

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